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Marcelo de  
Santana Porte

**METODOLOGIA DE INVESTIGAÇÃO EM  
AUDITORIA: PRÁTICAS ACADÊMICAS E  
TENDÊNCIAS**

**RESEARCH METHODOLOGY IN AUDITING:  
ACADEMIC PRACTICES AND TENDENCIES**

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Tese apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Doutor em Contabilidade, realizada sob a orientação científica do Doutor Joaquim Carlos da Costa Pinho, Professor Associado com Agregação, do Departamento de Economia, Gestão e Engenharia Industrial da Universidade de Aveiro e a Doutora Irina Saur-Amaral, Professora Auxiliar da Universidade Europeia.

Apoio financeiro da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) no âmbito do Programa de Doutorado Pleno no Exterior

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## O júri

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## palavras-chave

Auditoria, bibliometria, cienciometria, investigação, fraude, metodologia científica, pesquisa em contabilidade, produção científica, revisão de literatura, temas, tipologias, risco em auditoria.

## resumo

A tese é composta por três artigos distintos, contudo interligados pela temática das práticas acadêmicas da metodologia de investigação em auditoria e suas tendências.

Estudo 1: analisou a produtividade científica sobre auditoria de 2002 a 2013 com base em uma análise bibliométrica/cienciométrica de artigos científicos incluídos na *Web of Science*. O objetivo do estudo foi analisar, de forma pioneira, o reflexo da SOX na evolução temporal da atividade de investigação em auditoria. Os seus resultados contribuíram para a literatura ao demonstrar que mais da metade das publicações em auditoria estão concentradas em apenas 13 revistas científicas. Outra contribuição é a confirmação da importância das revistas *Auditing-a Journal of Practice & Theory*, *Accounting Review* e *Contemporary Accounting Research* para o desenvolvimento da literatura em auditoria. O presente artigo ainda apresenta indicadores que podem ser usados pelos pesquisadores no construto de seus estudos científicos para aumentarem a probabilidade de aceitação de suas publicações em revistas científicas e congressos.

Estudo 2: realizou um estudo sobre a caracterização da produção acadêmica em auditoria sanando um *gap* dentro da literatura que é a informação da associação temática existente dentro da própria produção acadêmica em auditoria. O objetivo do estudo foi identificar quais são as principais temáticas em auditoria e suas associações no período pós-SOX, por meio de uma análise de conteúdo, realizada de forma pioneira, dos objetivos e hipóteses de 1.650 publicações indexadas a *Web of Science* (2002-2014). Além de ter atualizado as temáticas conhecidas na literatura em auditoria de 16 para 22 temas, este estudo contribui para a literatura ao ter conseguido apresentar temas que emergiram na literatura de auditoria, como também ficou comprovada a existência de associações temáticas na área. Por fim, foi possível captar o impacto da SOX nas pesquisas científicas em auditoria.

Estudo 3: apresentou um estudo sobre as metodologias de investigação em auditoria caracterizando, de forma pioneira, não apenas os métodos de pesquisa e de investigação, como também as recolhas e análise de dados empregados nas investigações. Foi realizada uma análise de conteúdo em 276 artigos sobre *Fraud risk & audit risk* em 21 jornais indexados na *Web of Science* no período de 2002 a 2014. Os resultados informam que há uma predominância para o método quantitativo em detrimento ao qualitativo, e que os estudos estão concentrados em dois métodos de investigação: *empirical* e *experimental*. Havendo uma tendência para que o método *empirical* prevaleça nas pesquisas futuras. Além disso, é possível verificar o grande uso de questionário como dados primários e de conjunto de dados como dados secundários, este último concentrado no *COMPUSTAT* e o *Audit Analytics*. Outro fator importante para a literatura é que foi construído um mapa por tipo de método de pesquisa com as principais características metodológicas empregadas pelos pesquisadores em estudos de auditoria. Pela primeira vez um estudo sobre metodologias de investigação é realizado de forma específica para um único tema conhecido pela literatura em auditoria. Logo, os resultados aqui apontam que pesquisadores devem utilizar conjunto de dados, em especial o *COMPUSTAT*, para realização de suas pesquisas empíricas.

Por fim, esta tese inova ao conseguir captar o reflexo da SOX na representatividade da produção científica em auditoria, e ao apresentar para a literatura a evolução temática e a caracterização das metodologias de investigação dos estudos em auditoria.

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**keywords**

Audit, bibliometrics, scientometrics, investigation, fraud, scientific methodology, accounting research, scientific production, literature review, themes, typologies, risk in auditing.

**abstract**

This thesis consists of three different articles, related by the theme of academic practices of the research methodology in auditing and its tendencies.

Study 1: analyzed the scientific productivity in auditing from 2002 to 2013 grounded on a bibliometric/sciencimetric analysis of scientific articles included in the Web of Science platform. This study's objective was to analyze, in an innovative manner, the SOX effects on the evolution throughout time of the research activity in auditing. Its results contributed to the literature by demonstrating that more than fifty per cent of the publications in auditing are gathered in only 13 scientific journals. Another contribution is the validation of the importance of the journals Auditing-a Journal of Practice & Theory, Accounting Review and Contemporary Accounting Research to the improvement of auditing literature. The present article introduces indicators that may be utilized by researchers in their scientific studies planning to increase the probability of approval of their publications in scientific journals and conferences.

Study 2: carried out a study on the characterization of the academic production in auditing improving a gap in literature, which is the information on the thematic association existing in auditing academic production. This study aims to identify which are the main themes in auditing and their associations in the post-SOX period, by means of a content analysis of the objectives and hypotheses of 1,650 indexed publications in Web of Science (2002-2014), performed in an innovative way. Further to updating the familiar themes in auditing literature from 16 to 22 themes, this study's achievement was to present which themes emerged in auditing literature, as well as proving the existence of thematic associations in this field of study. Finally, we were able to determine the SOX impact in scientific researches in auditing.

Study 3: presented a pioneering study on research methodologies in auditing, classifying not only research and investigation methods, as well as how to collect and analyze the research. A content analysis was carried out in 276 articles on Fraud risk & audit risk in 21 indexed journals in Web of Science, in the period from 2002 to 2014. The results report that there is a predominance of the quantitative method at the expense of the qualitative one, and that studies are concentrated in two investigation methods: empirical and experimental. There is a tendency for the empirical method to prevail in future research. Furthermore, we observed the extensive implement of the questionnaire as primary data, and of data set as secondary data - focused on COMPUSTAT and Audit Analytics. Another important component in the literature is the design of a map by type of research method, concerning the main methodological characteristics employed by researchers in auditing studies. For the first time, a study on research methodologies is performed in a specific perspective relating to a single subject established in auditing literature. Consequently, the results indicate that researchers should utilize data sets, specifically COMPUSTAT, to carry out their empirical researches.

In conclusion, this thesis innovates by managing to outline the effects of SOX on scientific production representativeness in auditing, and by introducing in auditing literature the thematic evolution and the characterization of the research methodologies in auditing studies.

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## LIST OF ABBREVIATIONS

AAA	American Accounting Association
AAAJ	Accounting Auditing & Accountability Journal
AAERs	Accounting and Auditing Enforcement Releases
AAR	Australian Accounting Review
ABR	Accounting and Business Research
ABS	Abacus-a Journal of Acc. Fin. and Bus. Studies
ACOM	Audit committee
AF	Accounting and Finance
AH	Accounting Horizons
AI	Article Influence
AJBM	African Journal of Business Management
AJPT	Auditing: a Journal of Practice & Theory
AOS	Accounting Organizations and Society
AR	Accounting Review
BFP	Betriebswirtschaftliche Forschung Und Praxis
CAPES	<i>Coordenação de Aperfeiçoamento de Pessoal de Nível Superior</i>
CAR	Contemporary Accounting Research
CEO	Chief Executive Officer
CGIR	Corporate Governance-an International Review
CGOV	Corporate governance
CLT	Auditor-client relationship
CONT	Auditor-auditee contract
CPA	Critical Perspectives on Accounting
CRSP	Center for Research in Security Prices
CSO	Corporate Sustainability Officer
CSR	Corporate Social Responsibility
EAR	European Accounting Review
EDUC	Education
EF	Eigenfactor
ENANPADs	Annual Meeting of the National Association of Post-Graduation in Management Programs
EXTE	External audit

FASB	Financial Accounting Standards Board
GCOP	Going-concern opinion
GDP	Gross Domestic Product
IAASB	International Auditing and Assurance Standards Board
ICON	Internal control
IF	Impact Factor
IFRS	International Financial Reporting Standards
INTE	Internal audit
INTR	International regulation
ISI	Institute for Scientific Information
JAE	Journal of Accounting & Economics
JAPP	Journal of Accounting and Public Policy
JAR	Journal of Accounting Research
JBE	Journal of Business Ethics
JBF	Journal of Banking & Finance
JBFA	Journal of Business Finance & Accounting
JCR	Journal Citation Reports
JUDG	Judgment auditor
LITG	Liability & litigation
MBA	Master of Business Administration
MEDI	Media coverage in accounting
MRKT	Audit market
NAS	Non-audit services
PPP	Public-Private Partnership
PROC	Audit procedures
PROF	Profession
R&D	Research and Development
RAS	Review of Accounting Studies
REPO	Audit report & financial statement users
RESE	Research
RISK	Fraud risk & audit risk
S&T	Science and Technology
SAMP	Audit sampling

SEDC	Socio-economic data of the company
SOX	Sarbanes-Oxley Act
SSCI	Social Science Citation Index
TAX	Tax audit
USA	United States of America

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# **1. INTRODUCTION**

## **1.1 Motivation**

Day by day auditing's importance increases worldwide as a great pillar of accounting. This establishment occurred because of the consecutive corporate financial scandals reported by important business companies' media (for example, Enron, Parmalat, Petrobras). The Sarbanes-Oxley Act (SOX) in 2002 was an important fact in auditing, bringing innovation to the modus operandi in auditing, and information security in view of the management transparency. This fact worked as an impeller in academic accounting, leading researchers to determine its impact and search for tendencies that would emerge in time.

History has taught us that auditing researches are not limited to the professional models of the area, a concept that has evolved through the years. At the same time, the way of performing a literature review has also been changing, because the creation of databases, as Web of Science and Scopus, indexing important journals in all areas, provides researchers with rich literature sources for the development of their investigations.

Nevertheless, besides the variety of journals indexed in databases, we noticed that the methodological approaches adopted (philosophy of science and implied methods in accounting – auditing) are heterogenic and one could hardly expect a standardization of methods in a similar situation. Furthermore, we observed the methodologies were not usually employed in literature review, systemic or traditional, resulting in the use of methodologies of empirical nature.

Another historical fact is that the evolution in auditing provided researchers with the emerging of new themes embedded in the field of study. This is a very important achievement, because the scientific field in auditing is extensive, and should be studied by its sub-areas and not in general, after all, the themes employed in auditing are heterogenic in view of its essence and models linked to accounting.

It is not unusual in scientific research the use of databases as sample size, specially Web of Science and Scopus, automatically creating a limiter to gray literature in

view of other journals which are not indexed to the studied database and will be undisclosed. Even so, we observe that researchers in accounting are yielding to this practice.

The study of Krogstad and Smith (2003), carried out an analysis of citations to investigate the impact and the position of auditing in the articles published in Auditing-a Journal of Practice & Theory (AJPT) in indexed journals in Web of Science. A database with 3,102 citations was created comprehending the period from 1985 to 2000. In this manner, it was possible to identify the journals that most frequently quote AJPT, analyzing its contribution to the development of communication between the researches and the audit practice.

Solomon and Trotman (2003) analyzed the impact in literature of articles published in Accounting Organizations and Society (AOS) during the period from 1976 to 2000, which comprehended audit judgement. They utilized the data analysis of citations to judge their academic impact and compare to other leading journals in indexed research in Social Science Citation Index (SSCI), in Web of Science database.

According to the authors:

“The SSCI database is an international, multidisciplinary index to the literature of the social, behavioral, and related sciences, produced by the Institute for Scientific Information. It includes all significant articles from more than 1500 internationally refereed social sciences journals from 1972 to the present.” (Solomon & Trotman, 2003, p. 399).

Scopus was used in the study of De Villiers and Dumay (2013) to examine the characteristics of papers published in Accounting Auditing & Accountability Journal (AAAJ), Accounting Organizations and Society (AOS) and Critical Perspectives on Accounting (CPA). The idea was to introduce a simplified concept of five different parts of a scientific paper, considered as chief ones, in order to design a model to the compose quality papers.

As previously said, the studies are not limited to using exclusively Web of Science or Scopus. Contrary to most of the co-citation studies, Uysal (2010), proves that

by using a dataset of EBSCO Business Source Complete by means of a bibliometric analysis to assess publications in managerial ethics, with emphasis on accounting, in the period from 1988 to 2007.

This thesis made use of a literature's systemic review, in addition to bibliometric and scientometric parameters by means of a study in Web of Science's database. Finally, it was necessary to comprehend the themes in auditing and then analyze its methodologies.

The thematic research in auditing was initiated by the studies of Smith and Krogstad (1984) classifying 39 publications of Journal of Practice and Theory (AJPT) using a list of 15 different themes. These authors extended their study over the auditing thematic (1988) carrying out an analysis of 113 papers and subsequently (1991) evaluated 162 papers. Both studies analyzed exclusively AJPT's publications thereby creating the "SK typology" comprehending seven categories in auditing publications.

Maijor, Meuwissen, and Quadackers (2000) improved the "SK typology" and so developed nine categories on themes in auditing by analyzing 949 papers in 21 journals that published on auditing from 1990 to 1997. The themes found by the authors were: Professional issues, Firm administration, Audit markets, Audit education, Audit technology, Audit process, Reporting, Internal/Operational auditing and Other.

Themes on auditing are to be studied once more, this time by Lesage and Wechtler (2012), who developed a group of 16 themes in auditing, extending the aforesaid previous researches. Their study included a content analysis of 3,143 abstracts in 25 academic journals regarding the period from 1926 to 2005. In it we find the following themes in auditing: Profession (PROF), Audit report & financial statement users (REPO), International regulation (INTR), Auditor-client relationship (CLT), Non-audit services (NAS), Auditor-auditee contract (CONT), Liability & litigation (LITG), Corporate governance (CGOV), Going-concern opinion (GCOP), Audit market (MRKT), Tax audit (TAX), Education (EDUC), Audit sampling (SAMP), Judgment auditor (JUDG), Fraud risk & audit risk (RISK) and Audit procedures (PROC).

In Smith and Krogstad's precursor study (1984) we find some methodological aspects (survey, review, normative/prescriptive, modeling and experimental) in auditing

researches referring to each theme in the area. Subsequently, these methodological aspects were expanded in researches concerning survey, review, normative/prescriptive, modeling, experimental and empirical in the researches of Maijoor *et al.* (2000), Smith and Krogstad (1988, 1991).

Stephens, Summers, Williams, and Wood (2011) carried out a study in the period from 1990 to 2009, which assesses the ranking of doctoral programs in accounting based on research productivity. In their analysis we may find data related to the applied methodologies (analytical, archival, experimental), during this period, in 11 academic journals in relation to five areas in accounting comprehending auditing. Auditing's field of study is not subdivided. Therefore, the results found with reference to the applied methodologies in auditing are generic, disregarding the existing thematic variety.

Another study that may be quoted is the one of Theóphilo and Iudícibus (2005), who carried out a research in Brazil aiming to outline the scientific production in Accounting in this country, specifically Accounting and Management Control, from the perspective of Epistemology. In their study, the authors aimed to assess tendencies in the Brazilian scientific production using a sample of 20% of the scientific production generated in a 10-year period. In their conclusions, they summarize the necessity of increasing the analyzed period, broadening the field of study over international publications and, above all, the sample percentage to its totality, because only by those means it would be possible to know the real state of art of accounting worldwide.

These days, more and more journal editors have increased the demands on published articles, due to the lack of a systemic literature review or by not corresponding to the methodology employed. Many scientific works become susceptible to disapproval, as occurs to more than 80% (eighty per cent) in the main periodicals (Zimmerman, 1989).

The presented study is thus justified by the necessity of understanding which methodologies should be used independently of the circumstances, whether on the topic of literature review, or regarding the empirical studies in various contexts, in accounting and specifically in auditing.

In addition to the importance of the developed activity to researchers, an inspiring fact to this study is related to the deficit of researches focused on Research Methodology in Accounting, essentially considering publications in international databases concerning Auditing.

## **1.2 Objectives**

The main objective of this research is the outlining of a methodological map, to be used by researchers in accounting and specifically in auditing, assisting them to decide which methodologies should be employed in their researches, according to the context and considering the relevant epistemological and ontological particularities.

The research question that we intend to answer is:

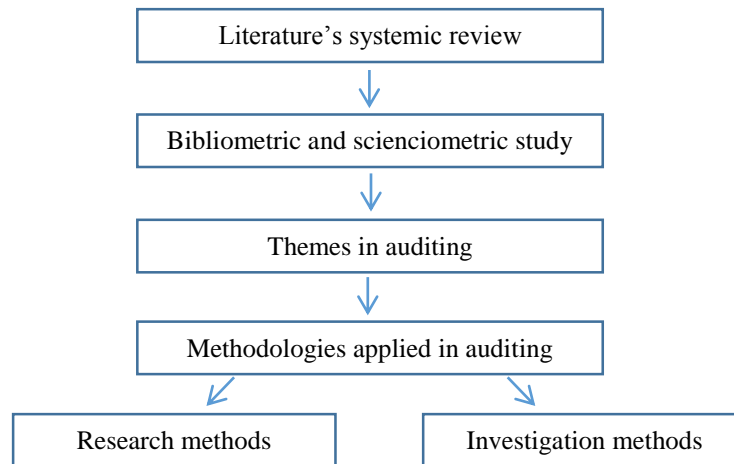
- How are the research methodologies in accounting (specifically in auditing) substantiated?

There are other specific sub-questions which we intend to respond in order to achieve the purpose set:

- a) Which are the bibliometric and scientometric characteristics of the auditing publications indexed in Web of Science?
- b) How is the evolutionary process of auditing themes in the post-SOX?
- c) Until the present moment, what do we know regarding the methodologies studied in auditing?

### 1.3 Thesis conceptual model

After the literature review, it was possible to design a conceptual model of the research, as follows:



**Figure 1** – Conceptual model

### 1.4 Expected contributions

This thesis aims to contribute to research in auditing in various ways. Initially, the first article aims to present results that may provoke a more sophisticated structuring of the fundamental theoretical arguments of the researches and academic texts, by analyzing and outlining bibliometric and scientiometric indicators in order to provide essential characteristics of the publications in auditing in the extended literature. After all, there is a great impasse concerning how to select the most adequate articles when structuring a research, considering the access to countless scientific journals and several databases by the researchers.

The second article intends to collaborate with a change in the evolutionary process of auditing themes after the passage of the Sarbanes-Oxley Act (SOX), i.e., if in fact the SOX was able to interfere in the themes' dynamic of the existing scientific publications in auditing, and how did it happened throughout time. These results are prominent so that scholars and researchers of the area may be informed about the themes in evidence, the ones losing strength through time and the new tendencies in the scientific world. Moreover, researchers are currently demanded to increase their number of publications

and, in that perspective, it is necessary to develop studies about themes that are not yet saturated in the academic world.

Finally, the third article aims to cooperate with literature in accounting on the subject of the main research methodologies most used in auditing studies, specifically in Fraud risk & audit risk publications. In brief, it would generate a methodological map, related to each research method found, so that researchers may have the knowledge of how auditing researches are being elaborated in the methodological aspect, thus deciding if they intend to follow the same methodologies already used by their colleagues or if they tend to innovate in new perspectives.

In general, the present thesis expects to provide enough information so scholars and researchers may achieve better efficiency and efficacy in their scientific studies, in themes debated in the classroom, in their tuition processes, in scholarship processes, in the sponsorship of their researches, in master and doctoral programs, among others.

With the increasing demands for results in the academic and scientific world, in addition to the lack of time in the achievement of such results, researches in auditing must have the knowledge about what, and how, scientific studies are being carried out in their field of study. Thereby, we expect researchers to increase their rates linked to their curricula, besides focusing with tranquility in activities more appealing to them and even innovative researches demanding more time in the pursue of remarkable results.

## **1.5 Structure**

The thesis is composed of three articles, which are connected in such a way that the second article could not be carried out without the first one, and so the third not without the second one.

The first article refers to a bibliometric and scientiometric study of the auditing researches indexed in *Web of Science* database concerning the period of 2002-2013. With this study it was possible to implement a systemic review of the literature and to have an accurate perspective of the number of existing researches in auditing, as well as identifying the main journals publishing in that field of study. Without this information, it would not be possible to stablish the methodological parameters to be used in the following studies.

This chapter was fully published to African Journal of Business Management (AJBM) and has a Quartile Q3 rating in the Web of Science, and is classified as B3 by the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)* in the area of Interdisciplinary evaluation. Its reference for publication for citing is as follows:

- Porte, M. S., Saur-Amaral, I. & Pinho, J. C. C. (2015). Audit research: A systematic literature review of published research on ISI Web of Science between 2002 and 2013. *African Journal of Business Management*, 9(4), 116-126. doi: 10.5897/AJBM2014.7607.

The second article is the pillar of this thesis. We find in it the existing auditing themes in the post-SOX period (2002-2014). Previous studies refer to the existence of auditing themes in the pre-SOX period until the year of 2005, i.e., there were no studies comprehending just the post-SOX period including the changes in the auditing scenario worldwide after the passage of the Sarbanes-Oxley Act. In this article, we could identify the existence of themes established by literature, themes in decline and themes emerging after the SOX enactment, and also their thematic associations. We emphasize that for the development of this study the database was updated, adding the year of 2014. This procedure was carried out in order to have information up to date.

This chapter was fully published to Accounting & Finance Review. This journal is indexed to Web of Science and Scopus, besides being classified as A2 by the Brazilian federal education agency, *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)*. Its reference for publication for citing is as follows:

- Porte, M. S., Saur-Amaral, I. & Pinho, J. C. C. Research in Audit: Main Themes. *Accounting & Finance Review*, 29(76), 41-59, jan./abr. 2018. DOI: 10.1590/1808-057x201804410.

The third and last research includes the study of research methodologies applied to the theme *Fraud risk & audit risk*. In it we identified the research methods (qualitative, quantitative and mixed), the data collection (primary and secondary), the investigation methods (*analytical, archival, empirical, experimental* and *survey*) and the type of data



analysis. It was also possible to demonstrate the research methods of the main journals indexed in *Web of Science* that publish about auditing.

Conclusively, in the final chapter we will present a reflexive overview of the studies and discuss their main conclusions.

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## **2. PAPER 1 – AUDIT RESEARCH: A SYSTEMATIC LITERATURE REVIEW OF PUBLISHED RESEARCH ON ISI WEB OF SCIENCE BETWEEN 2002 AND 2013**

### **2.1 Introduction**

Although researchers from several fields of knowledge have used bibliometric/scientometric techniques to know what is being produced in terms of scientific production, the number of studies on accounting, and specifically auditing, is quite low. The study conducted by Moya and Prior (2008) can be cited as an example. In the study, they highlight the scientific production on accounting from an entire decade published in Spanish journals. Another example is the research done by Neto, Riccio, and Sakata (2009), in which the authors analyze the temporal evolution of work published at the Annual Meeting of the National Association of Post-Graduation in Management Programs (ENANPADs), in Brazil. In both cases research was done between 1996 and 2005.

Studies on international entrepreneurship (e.g., Kraus, 2011) and on family businesses (e.g., Chrisman, Kellermanns, Chan, & Liano, 2010; Kraus, Filser, Gotzen, & Harms, 2011) were conducted some years ago. The objective of the studies was to describe the state of the art through the analysis of citation in order to characterize the main topics, gaps, research basis and tendencies in the field, thus demonstrating the need to know what is being published from a holistic view to interpret results.

Such research is important in terms of scientific research, as it refers to a bibliometric and scientometric perspective on worldwide scientific production on auditing. The analyses of the published work were done through the use of the database available on Web of Science of the Institute for Scientific Information (ISI), restricted to published works containing the word “audit”, contained in the Social Science Citation Index (SSCI), in the period between 2002 and 2013. This generated about 23,162 references cited of 2,394 published works from the Web of Science data base.

In our longitudinal study, we aim at presenting a global view of the state of the art of publications in auditing through a bibliometric and scientometric study of Web of

Science. We examined some specific objectives in the literature of the field as a basis, such as:

- Category from Web of Science;
- Distribution of the published sourced and number of citations;
- Sources of publications with Impact Factor (IF), Eigenfactor (EF), and Article Influence (AI);
- Chronological evolution of the publication number;
- Profile of the partnerships between authors, language of works, research funding;
- Countries of publication;
- Distribution of published Institutions;
- Description of the most cited documents;
- Productivity of authors and co-authors;
- Keywords most used;
- H-Index profile of publications.

This research will have as a scientific precept the study conducted by Verbeek, Debackere, Luwel, and Zimmermann (2002), which addresses the key indicators that should be used to support a bibliometric study.

In agreement with Verbeek *et al.* (2002), this study might be able to assist junior and senior researchers in future research. Also, there is a lack of research directed to bibliometrics and scientometrics in accounting, particularly concerning publications present in international databases and covering the auditing subject.

The study is divided into five sections. In addition to the introduction, we present a review of the literature, the methodology used in the study in the third section, the bibliometric and scientometric data found are presented in section four, and, in the conclusion, we discuss what can be taken from this research other than simply indicate limitations and suggest future research.

## 2.2 Review of the literature

It's not novelty that scholars from several sciences are concerned about what is published in their fields. There is, therefore, an increase in the frequency of use of bibliometrics/scientometrics in scientific studies as a methodological way of identifying the scientific production of peers. Bibliometric studies can be found in different fields, such as venture capital (Cornelius & Persson, 2006), economics (Lee, Cronin, McConnell, & Dean, 2010), supply chain management (Charvet, Cooper, & Gardner, 2008), corporate governance (Durisin & Puzone, 2009), marketing (Stremersch & Verhoef, 2005; Stremersch, Verniers, & Verhoef, 2007), family companies (Casillas & Acedo, 2007), among others.

With the development in technology and countless sources of publications in several fields, there is an increase in the need for researchers to use technological resources alongside the methodology research for a systematic review of the literature and even as a way to a better development of reliable indicators for the analysis of scientific activity, once the databases are being used as the sampling universe in several scientific researches, such as Web of Science from the Institute for Scientific Information (ISI) (Chang & Ho, 2010; Duan, 2011; Kostoff, Briggs, Rushenberg, Bowles, Icenhour, Nikodym, Barth, & Pecht, 2007; Kostoff, Tshiteya, Bowles, & Tuunanen, 2006; Machacek & Kolcunova, 2008; Nerur, Rasheed, & Natarajan, 2008).

In their study, Verbeek *et al.* (2002) demonstrate how science can be mapped using technological measurement instruments. It is worth noticing that the same authors also report that the quantitative indicators should be supplemented with qualitative analyses from the experts in each field.

It is common to link a quantitative study to a research involving bibliometrics/scientometrics, however there are qualitative studies, such as Leal, Almeida, and Bortolon (2013), and Bogdan, Iuliana, Valentin, and Vasile (2009) that are also used in the literature primarily to (i) explore how the field has evolved over time, (ii) identify groups of research themes that have emerged over time and the relationships between them, and also (iii) identify the cooperation evaluation between authors and countries.

There are several forms of applicability of bibliometric/scientometric studies, such as:

- (i) **disclosure of the publications of a country** (Butler, 2003; Daraio & Moed, 2011; Fetscherin, Voss, & Gugler, 2010; Jacobsson & Rickne, 2004; Jimenez-Contreras, Anegon, & Lopez-Cozar, 2003; Kostoff, Briggs, *et al.*, 2007; Kostoff, del Rio, Cortes, Smith, Smith, Wagner, Leydesdorff, Karypis, Malpohl, & Tshiteya, 2005; Kostoff, Johnson, Bowles, Bhattacharya, Icenhour, Nikodym, Barth, & Dodbele, 2007; Kostoff *et al.*, 2006; Sarafoglou, 2006; Schoeneck, Porter, Kostoff, & Berger, 2011);
- (ii) **creation of research networks between university-industry-government/university-industry/public-private partnership (PPP)** (Abramo, D'Angelo, Di Costa, & Solazzi, 2009; 2011; Hayashi, 2003; Marsilio, Cappellaro, & Cuccurullo, 2011; Park & Leydesdorff, 2010);
- (iii) **a field/subfield of Science** (Alfalla-Luque & Medina-Lopez, 2009; Chabowski, Mena, & Gonzalez-Padron, 2011; Cornelius, Landstrom, & Persson, 2006; Etemad, 2004; Kim & McMillan, 2008; Ma & Stern, 2006; Rubin & Chang, 2003; Serenko & Bontis, 2013; Talukdar, 2011; Uysal, 2010; Walter, 2010);
- (iv) **specific contributions of an author** (Diamond, 2007; Meyer, Pereira, Persson, & Granstrand, 2004; Uslay, Morgan, & Sheth, 2009);
- (v) **scientific production of a scientific journal or journal group** (Biemans, Griffin, & Moenaert, 2007; Casey & McMillan, 2008; Francisco, 2011; Kirchler & Holzl, 2006; Mazzon & Hernandez, 2013; McMillan & Casey, 2007; Ramos-Rodriguez & Ruiz-Navarro, 2004; Salas & Sobrevias, 2011; Valacich, Fuller, Schneider, & Dennis, 2006);
- (vi) **books as knowledge distribution agents** (Serenko, Bontis, & Moshonsky, 2012);
- (vii) **dissemination of a theory in a scientific field** (Weerakkody, Dwivedi, & Irani, 2009).

In a research conducted by Groot and Garcia-Valderrama (2006) it is seen that the number of publications in top international journals is the best predictor of the results of peer review, emphasizing how important it is for the researcher to publish in international

journals to raise their academic reputation or even to assist in raising funds for investment in research and development.

Nevertheless, funding agencies use such resources as one of the indicators to assess the quality of the publications, verifying whether the research makes use of good reputation sources of publications, and whether the research references have a good impact factor (IF), so that they can offer financial support for research. According to Groot and Garcia-Valderrama (2006), to provide financial resources to support academic research programs the sponsors have been evaluating the quality of their publications and productivity of their collaborators.

With the global economic downturn the economics of knowledge becomes an important factor for increasing the Gross Domestic Product (GDP) of a nation. Investment in Research and Development (R&D) is one way to try to overcome recession in the future. However, high R&D costs associated with limited sources of public funding increasingly restrict the allocation of funds for scientific development which are distributed according to the merit and capacity of researchers (Abramo, D'Angelo, & Caprasecca, 2009).

Confirming the information above, Bengisu and Nekhili (2006) conducted a study in which they seek to align the Turkish efforts of technology anticipation to the international Science and Technology (S&T) activities. Furthermore, they aimed to collect quantitative information on priority technologies in order to fund research and invest in technology.

## **2.3 Methodology**

The present study aimed to outline the characteristics of the scientific literature on auditing in Web of Science from 2002 – when the Sarbanes-Oxley Act (SOX) was enacted – to 2013, in the Social Science Citation Index (SSCI) through a bibliometric and scientometric analysis.

The sample period starts in 2002 due to the global impact that auditing experienced after the scandal involving Eron's financial reports, audited by Arthur Andersen, which culminated in the creation of SOX. The objective of this act is to ensure the formulation of auditing mechanisms and reliable security in businesses, including the

guidelines for the formation of committees in charge of supervising its activities and operations in order to reduce the risks of the business, prevent fraud or ensure there is a way to identify it if it takes place, guaranteeing transparency in corporate management.

The word "audit\*" was used in the topic field (including title, abstract and keywords) with a limited survey period from 1900 to 2013 on the citation database data at the SSCI. After this procedure the refinement showed 40,140 results. The next process was the completion of the document type selection, refining Article and Review groups, therefore reducing the results to 34,670. After that, the Business Economics research field was selected, as, based on a pre-test, this is the field that is closest to the proposed theme, creating an indicator of 4,572 results. However, it is worth noticing that, although there was a refining in the above-mentioned field, other fields are present since the same publication might be classified in more than one field so, to guarantee the best research scope, there were no exclusions of fields that weren't refined precisely due to the fact that these publications are in another field, and if such exclusion happened it would also exclude the publications from one of the fields chosen for refinement. It is worth noticing that the present data listed here was updated up to January 10, 2014.

The next step was to select the publications from 2002 to 2013, a total of 2,480 results, and transport them to the EndNote X5 program so that a Systematic Literature Review could be conducted in order to highlight the results found in only in the auditing field. After this it was possible to find 2,394 publications in auditing once the outlines were excluded. Then these references were transported to the Nvivo10 program with purpose of developing a specific database on the subject so that a quantitative and qualitative approach could be conducted based on statistics, mathematics and content analyzes.

The results will provide future researchers with the knowledge of who the main auditing authors are in the Web of Science database, and will also provide information such as: which institutions are performing studies in the field, which publication sources, authors, and countries publish the most, what are the most used keywords, among others.



## 2.4 Results

Based on the methodological assumptions used for the period between 2002 and 2013, after the Systematic Literature Review, 86 publications were found from a total of 2,480 publications to have no connection with the auditing field, so 2,394 publications were used in this research.

**Table 1** – Profile of the analyzed publications

Profile	P	F1 (≅)
Publications from 2002 to 2013 in Web of Science (filter the use of the term “audit*”) in the field of Business Economics	2,480	100%
Outlines (Excluded articles for not having any connection to the auditing field)	86	3.47%
Publications selected after content analyzes linked to the auditing field	<b>2,394</b>	<b>96.53%</b>
Publications analyzed in this research	2,394	100%

P = Number of publications.

The publications in auditing can be divided into four major categories classified by Web of Science: Business Finance, Economics, Management and Business. However, Business Finance is the most expressive because it consists of more than half of the publications in the field. The other three balance each other with a range of 19% to 22% of the found results. It is worth noticing that the same item can be classified in more than one area.

**Table 2** – Category distribution in Web of Science by number of publication with a minimum of 2%

Web of Science categories	P	F1 (≅)
Business Finance	<b>1,436</b>	<b>60%</b>
Economics	524	22%
Management	507	21%
Business	449	19%
Ethics	114	5%
Public Administration	75	3%
Operations Research Management Science	54	2%

P = Number of publications.

The journal that publishes the most in auditing is the Auditing Journal of Practice & Theory (299; 12.5%), followed by Accounting Review (162; 6.8%) and Contemporary Accounting Research (158; 6.6%). The top 13 journals put together represent more than half of the publications in the field (1,233; 51.5%), highlighting the importance its editors give to the topic. The Accounting Review also carries another feature, the ratio of times its studies were cited (3,577) and without self-citations (3,191), thus having the second highest average of citations 22.08, short only to the Journal of Accounting Research with an average of 31.20 citations per publication.

**Table 3** – Distribution of publication sources according to General Data

Publication sources	Acronym	P	F1 ( $\cong$ )	C1	C2	$\bar{x}$
Auditing-a Journal of Practice & Theory	AJPT	<b>299</b>	<b>12.5%</b>	2,263	1,531	7.57
Accounting Review	AR	162	6.8%	<b>3,577</b>	<b>3,191</b>	22.08
Contemporary Accounting Research	CAR	158	6.6%	1,982	1,738	12.54
Journal of Business Ethics	JBE	105	4.4%	668	609	6.36
Accounting Organizations and Society	AOS	80	3.3%	1,043	925	13.04
Corporate Governance-an International Review	CGIR	62	2.6%	386	345	6.23
Journal of Accounting and Public Policy	JAPP	60	2.5%	166	142	2.77
Journal of Accounting Research	JAR	54	2.3%	1,685	1,638	<b>31.20</b>
Accounting Horizons	AH	54	2.3%	162	145	3
Journal of Accounting & Economics	JAЕ	54	2.3%	2,214	2,143	41
African Journal of Business Management	AJBM	52	2.2%	28	24	0.54
Accounting and Finance	AF	50	2.1%	150	126	3
European Accounting Review	EAR	43	1.8%	176	164	4.09
The other 330 publication sources	-	1,161	48.5%	NA	NA	NA
Total		2,394	100%	-	-	-

P = Number of publications; C1 = Number of citations. C2 = Number of citation excluding self-citations; = Average of citations per item.

There are many publication sources that hold productions linked to the auditing field (343). However, more than half of the publications (61.5%) can be found in only 13 journals (Table 3), only nine of which include Impact Factor (IF)<sup>1</sup> > 1 (Table 4). The journal that stands out is the Journal of Accounting & Economics for having an IF close to four, and for being the third source of publication with the largest Eigenfactor (EF)<sup>2</sup>, second only to the Journal of Business Ethics and Accounting Review, in addition to also having greater Article Influence (AI)<sup>3</sup>.

<sup>1</sup> The Impact Factor is the average of the number of times articles from the journal published in the last two years have been cited in the year in the Journal Citation Reports (JCR). The impact factor is calculated by dividing the number of citations in the JCR a year by the total number of articles published in the two previous years. An impact factor of 1.0 means that, on average, the articles published one or two years ago have been cited one time. An impact factor of 2.5 means that, on average, the articles published one or two years ago have been cited two and half times. The pieces might be citing articles published in the same journal. However, most of the citing articles are from different journals, proceedings or books indexed by the Web of Science. Source: [http://admin-apps.webofknowledge.com/JCR/help/h\\_eigenfact.htm](http://admin-apps.webofknowledge.com/JCR/help/h_eigenfact.htm)

<sup>2</sup> The Eigenfactor Score calculation is based on the number of times journal articles published in the last five years have been cited in the JCR year, but also considers that journals have contributed to these journal citations highly cited journals influence to the network more than lesser cited journals. The reference to an article in a journal to another article from the same journal is removed, so that Eigenfactor Scores are not influenced by journal self-citation. Source: [http://admin-apps.webofknowledge.com/JCR/help/h\\_eigenfact.htm](http://admin-apps.webofknowledge.com/JCR/help/h_eigenfact.htm)

<sup>3</sup> The Article Influence determines the average influence of articles in a journal over the first five years after publication. It is calculated by dividing a periodical Eigenfactor Score by the number of articles in the journal, normalized as a fraction of all articles in all publications. This measure is roughly comparable to the journal Impact Factor of 5 years considering that it is an influence citation relation of a journal with the size of the contribution of the journal article for a period of five years. The average Article Influence Score is 1.00. A score higher than 1.00 indicates that each article in the journal has an above average influence. A

**Table 4** – Top 13 publication sources by Impact Factor (IF) and Eigenfactor (EF) and Article Influence (AI)

Publication source	Acronym	IF	EF	AI
Journal of Accounting & Economics	JAE	<b>3.912</b>	0.00741	<b>2.453</b>
Accounting Review	AR	2.319	0.00795	1.474
Journal of Accounting Research	JAR	2.192	0.00703	2.210
Accounting Organizations and Society	AOS	1.867	0.00364	1.028
Contemporary Accounting Research	CAR	1.564	0.00348	1.094
Corporate Governance-an International Review	CGIR	1.400	0.00164	0.364
Accounting Horizons	AH	1.288	0.00117	NA
Journal of Business Ethics	JBE	1.253	<b>0.01395</b>	0.450
Auditing-a Journal of Practice & Theory	AJPT	1.015	0.00110	0.483
Accounting and Finance	AF	0.875	0.00065	0.192
Journal of Accounting and Public Policy	JAPP	0.770	0.00100	NA
European Accounting Review	EAR	0.654	0.00102	0.453
African Journal of Business Management	AJBM	NA	NA	NA

Impact Factor (IF) from 2012; Eigenfactor (EF) e Article Influence (AI) updated until 01/10/2014.

The results show that the authors of almost one third of the publications (758) from the Top 13 publication sources focused on only six journals (AOS, CAR, CGIR, AH, JBE and AJPT) with an IF between ]1;2]. The result is even better considering the publication sources with an IF between ]1;3] with eight publications (JAE, AR, JAR, AOS, CAR, CGIR, AH, JBE e AJPT) which form a group of 974 publications responsible for nearly 40% of the publications in auditing.

**Table 5** – Distribution of the Impact Factor (FI) of the Top 13 publication sources

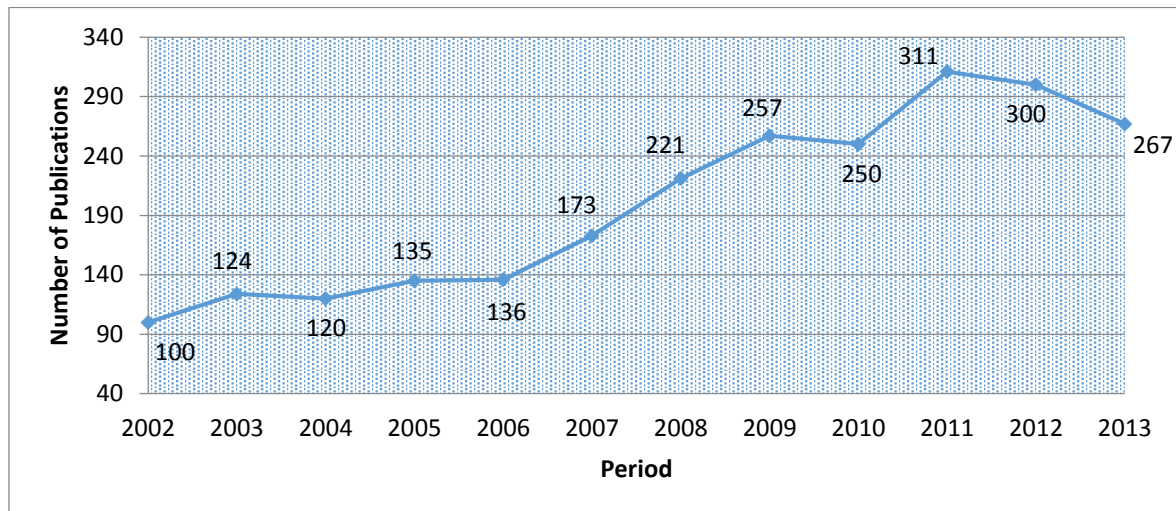
Impact factor in 2012	J	P	Fi (≅)
$0 < FI \leq 1$	3	153	6,4%
$1 < FI \leq 2$	<b>6</b>	<b>758</b>	<b>31.7%</b>
$2 < FI \leq 3$	2	216	9%
$3 < FI$	1	54	2.3%
Not informed	1	52	2.2%
Not analyzed (N/A)	330	1,161	48.5%
Total	343	2,394	100%

J = Number of publication sources; P = Number of publications.

It is noticeable that over time there was a trend of more journals publishing about auditing – 2011, with 311 published studies, can be highlighted – since the number of submitted publications probably also increased because of the enactment of the Sarbanes-Oxley Act (SOX) in 2002. The research cannot explain the reason for the increase in publications, but it is worth remembering that in 2005 the public companies of the European Union were forced to adopt the standards of the International Financial

score less than 1.00 indicates that each article in the journal has below-average influence. Source: [http://admin-apps.webofknowledge.com/JCR/help/h\\_eigenfact.htm](http://admin-apps.webofknowledge.com/JCR/help/h_eigenfact.htm)

Reporting Standards (IFRS), possibly as an indicator of the increase in auditing productions. It is important that other researchers check what the real reason for the growth of such publications was and thus complement the information reported here.



**Figure 1** – Distribution of publications per year

Based on Table 6 we can notice that 79% of the articles found here were produced in partnerships, thus demonstrating the need for group work in order to obtain more significant results. However, the partnerships of two or three authors are significant, as they represent approximately 69% of the studies.

**Table 6** – Authors partnership profile, language of publication and research incentive

Profile	P	Fi (≅)
<b>Number of analyze publications</b>	<b>2,394</b>	<b>100%</b>
Number of authors per publication		
Publications by one author	495	21%
Publications by two authors	<b>853</b>	<b>36%</b>
Publications by three authors	797	33%
Publications by four authors	205	9%
Publications by more than four authors	44	2%
Language of publications		
English	<b>2,298</b>	<b>96%</b>
German	28	1,2%
Spanish	21	0,9%
Russian	16	0,7%
French	12	0,5%
Other Languages	19	0,8%
Research incentive		
Funded	23	1%
No information about funding	<b>2,371</b>	<b>99%</b>

P = Number of publications.

Still on Table 6 we can detect that the studies are mostly published in English (96%). In second place, with a much smaller representation, are the publications written in

German, Spanish, Russian and French. Unfortunately the results show that only 1% of the reported studies reported had funding sources for their research, confirming that governments/companies are not willing to invest in new studies in the auditing field.

A total of 70 countries produced publications involving the auditing field, but 35 of the records did not inform the country of affiliation for its publications. American publications represent more than half of the publications in auditing, followed by Australia, Canada, England, China, among others.

**Table 7** – Top 10 countries with publications

<b>Countries</b>	<b>P</b>	<b>Fi (≅)</b>
USA	<b>1,234</b>	<b>51.5%</b>
Australia	213	8.9%
Canada	199	8.3%
England	177	7.4%
China	145	6.1%
Germany	83	3.5%
Taiwan	82	3.4%
Spain	76	3.2%
Netherlands	74	3.1%
Nova Zealand	59	2.5%
60 other countries	657	27.4%

P = Number of publications.

In accordance with the fact that more than half of publications are American, seven of the 11 institutions that publish the in auditing are also American, with emphasis on the Florida International University System with 130 publications.

**Table 8** – Distribution of the institutions (organizations-enhanced) with publications (authors and coauthors)

<b>Institutions (<i>organizations-enhanced</i>)</b>	<b>Country</b>	<b>P</b>	<b>Fi (≅)</b>
Florida International University System	USA	<b>130</b>	<b>5.4%</b>
University of California System	USA	55	2.3%
University of New South Wales	Australia	54	2.3%
University of Wisconsin System	USA	52	2.2%
Pennsylvania Commonwealth System of Higher Education Pcshe	USA	51	2.1%
Hong Kong Polytechnic University	Hong Kong	42	1.8%
Northeastern University	USA	42	1.8%
Nanyang Technological University	Singapore	39	1.6%
Nanyang Technological University National Institute of Education	Singapore	39	1.6%
Nie Singapore			
Florida International University	USA	38	1.6%
University of Wisconsin Madison	USA	38	1.6%

P = Number of publications

The article with highest number of citations is "Theorizing change: The role of professional associations in the transformation of institutionalized fields", by authors Greenwood, Suddaby and Hinings, with 437 citations since 2002 and with the highest

citation average: 33.32 per year. It's worth noticing that the content of the quotation was not analyzed, making it possible for future research to address this issue so that we may have a parameter of how these citations occurred.

**Table 9** – Top 20 most cited studies

Ranking	Times cited	$\bar{x}$	Authors	Title of the article	Year
1	437	33.62	Greenwood, R; Suddaby, R; Hinings, CR	Theorizing change: The role of professional associations in the transformation of institutionalized fields	2002
2	355	27.31	Klein, A	Audit committee, board of director characteristics, and earnings management	2002
3	238	18.31	Frankel, RM; Johnson, MF; Nelson, KK	The relation between auditors' fees for nonaudit services and earnings management	2002
4	217	21.70	Ball, R; Shivakumar, L	Earnings quality in UK private firms: comparative loss recognition timeliness	2005
5	214	17.83	Ball, R; Robin, A; Wu, JS	Incentives versus standards: properties of accounting income in four East Asian countries	2003
6	187	15.58	Ashbaugh, H; LaFond, R; Mayhew, BW	Do nonaudit services compromise auditor independence? Further evidence	2003
7	184	14.15	Mitton, T	A cross-firm analysis of the impact of corporate governance on the East Asian financial crisis	2002
8	170	13.08	DeFond, ML; Raghunandan, K; Subramanyam, KR	Do non-audit service fees impair auditor independence? Evidence from going concern audit opinions	2002
9	159	12.23	Morrison, EW	Newcomers' relationships: The role of social network ties during socialization	2002
10	137	11.42	Joh, SW	Corporate governance and firm profitability: evidence from Korea before the economic crisis	2003
11	135	13.50	Agrawal, A; Chadha, S	Corporate governance and accounting scandals	2005
12	128	11.64	Palmrose, ZV; Richardson, VJ; Scholz, S	Determinants of market reactions to restatement announcements	2004
13	125	15.62	Olken, Benjamin A.	Monitoring corruption: Evidence from a field experiment in Indonesia	2007
14	125	9.62	Nelson, MW; Elliott, JA; Tarpley, RL	Evidence from auditors about managers' and auditors' earnings management decisions	2002
15	124	10.33	Xie, B; Davidson, WN; DaDalt, PJ	Earnings management and corporate governance: the role of the board and the audit committee	2003
16	122	10.17	Myers, JN; Myers, LA; Omer, TC	Exploring the term of the auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation?	2003
17	120	10.91	Anderson, RC; Mansi, SA; Reeb, DM	Board characteristics, accounting report integrity, and the cost of debt	2004
18	115	9.58	Chung, HS; Kallapur, S	Client importance, non audit services, and abnormal accruals	2003
19	114	10.36	Abbott, LJ; Parker, S; Peters, GF	Audit committee characteristics and restatements	2004
20	112	11.20	Srinivasan, S	Consequences of financial reporting failure for outside directors: Evidence from accounting restatements and audit committee members	2005

$\bar{x}$  = Average of citations per year.



The database composed of 2,394 publications includes about 23,162 citations, and, excluding self-citations, there are 13,010. It's worth noticing that in more than 10,000 studies there was no citation of the studies analyzed in this research. Excluding self-citations, this number is reduced to 9,210 researches, yielding an average of 9.68 citations per publication and an H-Index of 66.

**Table 11** – H-index profile of the analyzed publications

Profile	P
Publications analyzed in this research (a)	2,394
Number of times the analyzed publications were cited (b)	23,162
Number of times the analyzed publications were cited excluding self-citations among referred analyzed publications	13,010
Number of publications that cited the analyzed publications	10,695
Number of publications that cited the analyzed without self-citations among referred analyzed publications	9,210
Average of times the publications were cited ( $b \div a$ )	9.68
H-index	66

P = Number of publications.

Through the results found here, we may try to plan, through a global vision, the state of the art in auditing publications through a bibliometric and scientometric study conducted in Web of Science.

## 2.5 Final considerations

Research limitations/implications - The sample consists of articles published in various academic journals that are indexed in the Web of Science from the Institute for Scientific Information (ISI).

The main purpose of this study is to present an overview of the state of the art in auditing publications through a bibliometric/scientometric study in the Web of Science. Practical implications - about 2,394 publications involving the auditing theme during the period from 2002 to 2013, assembled 60% of the results in the category Business Finance; The journal that publishes the most in the field is the Auditing Journal of Practice & Theory with 299 publications, representing 12.5% of the total; the journal that has the most citations is the Accounting Review with 3,577 studies cited including self-citations, and 3,191 without self-citations, however the one that has the best average of citations is the Journal of Accounting Research with an average of 31.20 citations per publication; The Journal of Accounting & Economics has the highest Impact Factor (IF = 3.912) and the highest Article Influence (AI = 2.453), the Journal of Accounting and Business Ethics



Review have the highest Eigenfactor ( $EF = 0.01395$ ); It is clear that over the years the publications in auditing have been evolving, but this research can not explain the reason for this increase in publications.

However it is worth noticing that the Sarbanes-Oxley Act (SOX) was created in 2002 and that European Union publicly held companies were forced to adopt the rules of International Financial Reporting Standards (IFRS) in 2005; Since it is not easy for one to do research alone, results showed that 79% auditing productions are conducted in partnerships. There is a balance between two authors (36%) and three authors (33%) per publication. Besides, almost all (96%) are written in English and most researches in the field (99%) have no funding sources, thus demonstrating the difficulty experienced by researchers in the field; The country that publishes the most is the USA, with more than half (55%) of the publications found. The USA also houses seven of the 11 institutions that produce the most about this topic. The one that stands out is the Florida International University System, with over 130 publications in auditing; The article that stands out with the highest number of citations is "Theorizing change: the role of professional associations in the transformation of institutionalized fields", by authors Greenwood, Suddaby and Hinings, with 437 citations since 2002 and the highest average of citations per year 33.32; The author with the largest number of publications in auditing is Kannan Raghunandan, with 26 publications, being cited 525 times and with the second highest average of citations per study, 20.19, followed only by Jere R. Francis with an average of 26.76 citations;

The most common keywords, except for "audit" because it was already used as a filter, were: management, earnings, quality, performance, corporate, governance, risk auditor, information; The data collected here formed a database of 2,394 publications, with 23,162 citations and 13,010 without self-citation. It's worth noticing that over 10,000 studies have cited one of the publications surveyed here and, excluding self-citation, over 9,000 publications, generating an average of 9.68 citations per publication and an H-Index of 66.

Originality/value - The main contribution of this study is that it systematically plans the main features of the auditing publications in the extended literature through a bibliometric and scientometric analysis to create its state of the art. In addition, the study

outlines the main contributions in auditing in the indexed literature in the database of the Web of Science.

Future research - It is important that other researchers investigate what the real reason is for the growth in auditing publications and identify relevant concepts, theories, methodologies, and emerging issues that have arisen in the field of auditing given that there is a gap for future transactional empirical studies in the literature.

### **3. PAPER 2 – RESEARCH IN AUDIT: MAIN THEMES**

#### **3.1 Introduction**

Since the precursor work of Smith and Krogstad (1984), expanded by the same authors in later years (1988, 1991), in which they developed a seven category typology, “SK typology” in order to study the academic production about auditing in *A Journal of Practice and Theory (AJPT)*, researchers have been using its typology to carry out bibliometric and scientometric comparisons in scientific papers. As research on characterization of the academic production in auditing is in its third decade, the following arguments are pertinent: Which journals in auditing production are the most relevant? Which themes emerging and which are declining after the Sarbanes-Oxley Act? How are auditing themes evolving? How are themes associated in auditing publications?

These questions were motivated, at first, by the creation of the Sarbanes-Oxley Act (SOX), that aims “to protect investors, improving precision and reliability of the corporative disclosures in compliance with the law of securities, and for other purposes” (SOX, 2002), which was a turning point to the academic world in auditing study and in auditors practices.

Second, in auditing literature, information on related themes in the academic production is undisclosed, i.e., we know which were the major themes addressed along the years, but we do not know which associations were made between them. After all, as a researcher writes about an audit theme, as for example Corporate Governance, he or she may have it associated with another one of auditing itself, as Audit Honoraria.

In third place, the present research was based on the study of Lesage and Wechtler (2012), over the period from 1926 to 2005, addressing 16 themes on audit investigations. Lesage and Wechtler (2012) expanded the investigations by Maijor, Meuwissen, and Quadackers (2000) in which they have identified nine themes (from 1990 to 1997), two in addition to the precursor study accomplished by Smith and Krogstad (1984, 1988, 1991) – responsible for the creation of “SK typology” – presenting the seven first themes tracked in audit scientific investigation. Therefore, the purpose is to accomplish something not yet seen to the post-SOX era, i.e., a study of themes published in audit based on research

objectives and hypothesis through a content analysis. Many researches are carried out based in title, abstract and keywords (Carcello, Hermanson, & Ye, 2011; Garcia-Meca & Sanchez-Ballesta, 2009). However, we know that more than computer aid in finding results, analyzing the articles content and its essence is still a preponderant technique for determining, in a clear and credible manner, the information to be extracted.

This study aims to identify the main themes and their associations in auditing in post-SOX era. Therefore, 1,650 publications in auditing were examined, considering 21 journals between 2002 and 2014, through a content analysis of the research objectives and hypothesis.

In the next section, we will describe the methodological procedures employed in this study. Later, we will present the first part of the results, which consider the main themes addressed in auditing. Consequently, on the second and last part of the results we will discuss the applications for the findings of the previous section. Finally, we conclude the study with the discussion of its results, limitations and some implications for future research.

## **3.2 Method**

### **3.2.1 Content analysis strategy**

Different from studies based on title, keywords and abstract (Cruz & Teixeira, 2010; Fetscherin & Usunier, 2012; Lesage & Wechtler, 2012; Porte, Saur-Amaral, & Pinho, 2015; Silva & Teixeira, 2009; Uysal, 2010), the present research is based mainly on the analysis of objectives and hypothesis of the publications indexed in Web of Science from 2002 – year of the signature of the Sarbanes-Oxley Act (SOX) – in the Social Science Citation Index (SSCI), to 2014, by means of a content analysis. The decision of using as a reference for this research the Institute for Scientific Information (ISI) database, Web of Science™ Core Collection, was because it is considered one of the most important information sources for scientific investigation, used in many studies as Duan (2011), Kostoff *et al.* (2007), Kostoff, Tshiteya, Bowles, and Tuunanen (2006), Krogstad and Smith (2003) and Nerur, Rasheed, and Natarajan (2008). The period of the sample initiates in 2002, as a consequence of the worldwide impact in auditing due to the scandals related

to Enron financial reports audited by Arthur Andersen's audit, which resulted in SOX enacting, and ends in 2014 because its data was collected in February 18<sup>th</sup> 2015. Therefore, the 2015 articles were not taken into account once that was the ongoing year.

The first step was to use the word *audit\** in order to find its derived terminologies, as *audit*, *auditing*, *auditor* or *auditors* in the blank *Topic* (consisting of title, abstract and keywords) in the citation index of SSCI. After that procedure, the refined search produced 25,530 results. The second step was to sort out documents into types, separating two groups, *Article* and *Review*, thus reducing to 23,416 results. In the third step, the research field *Business Economics* was selected, as, after a pre-test, this was found to be the closest area to the proposed theme, generating 2,846 results, distributed in 385 Journals. However, it must be emphasized that, although the search was refined, other areas were taken into account because the same publication may be classified in more than one area. Therefore, in view of an appropriate scope of the research, there were no exclusions made on the new areas resulting from the selection of that group. If we had made such exclusions, we would also exclude publications of *Business Economics*. The fourth step was to exclude outliers (180). It is important to point out that the outliers identified correspond to the publications that were not associated to auditing or were withdrawn by journals editors. The fifth step was to organize the 2,666 results identified in each publication source. However, 135 journals had only one publication. Therefore, only those corresponding to at least one percent of the total (of 2,666) were selected – meaning that the selected journals had at least 26 publications from 2002 to 2014 – composing a new database with 1,650 results in 21 journals, as seen in Table 1.

The study of Lesage and Wechtler (2012) was used to guide the cataloguing of the themes. At last, the data was transferred to the quantitative analysis program SPSS for data tabulation and descriptive statistical analysis which concluded the content analysis of the study.

As described in Table 1 the top journals selected in the procedure above were Auditing - a Journal of Practice & Theory (AJPT; 330); Accounting Review (AR; 178) and Contemporary Accounting Research (CAR; 171), in addition to other auditing studies (Bonner, Hesford, Van der Stede, & Young, 2006; Krogstad & Smith, 2003; Solomon & Trotman, 2003). The three journals are responsible for not much more than 40 per cent of

the publications in auditing. Because all three journals appear to be relevant to scientific development in this field throughout that period (2002-2014), they were the highlights of this study's thematic production analysis.

**Table 1** – Comparative scope

Journal	Abbrev.	Country	Nb. of articles	
			Amount	%
Abacus-a Journal of Acc. Fin. and Bus. Studies	ABS	AUS	32	1.9%
Accounting and Business Research	ABR	UK	35	2.1%
Accounting and Finance	AF	USA	56	3.4%
Accounting Auditing & Accountability Journal	AAAJ	AUS	31	1.9%
Accounting Horizons	AH	USA	79	4.8%
Accounting Organizations and Society	AOS	UK	94	5.7%
Accounting Review	AR	USA	<b>178</b>	<b>10.8%</b>
African Journal of Business Management	AJBM	NIG	51	3.1%
Auditing-a Journal of Practice & Theory	AJPT	USA	<b>330</b>	<b>20.0%</b>
Australian Accounting Review	AAR	USA	47	2.8%
Betriebswirtschaftliche Forschung und Praxis	BFP	GER	32	1.9%
Contemporary Accounting Research	CAR	CAN	<b>171</b>	<b>10.4%</b>
Corporate Governance-an International Review	CGIR	UK	65	3.9%
European Accounting Review	EAR*	UK	46	2.8%
Journal of Accounting & Economics	JAE	USA	64	3.9%
Journal of Accounting and Public Policy	JAPP	USA	67	4.1%
Journal of Accounting Research	JAR	USA	64	3.9%
Journal of Banking & Finance	JBFB	NET	28	1.7%
Journal of Business Ethics	JBE	NET	115	7.0%
Journal of Business Finance & Accounting	JBFA	UK	36	2.2%
Review of Accounting Studies	RAS	NET	29	1.8%
Total	21	-	1650	100%

**Notes:**

\* EAR: is the journal of the European Accounting Association.

These three journals are responsible for not much more than 40 per cent of the publications in auditing. Because all three journals appear to be relevant to scientific development in this field throughout that period (2002-2014), they were the highlights of this study's thematic production analysis.

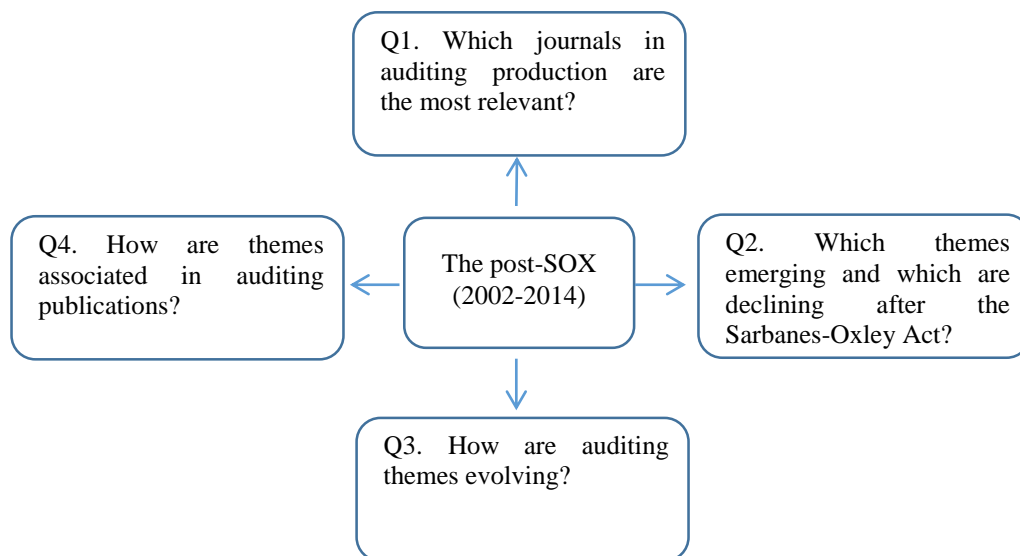
### 3.2.2 Coding methods

Due to the large amount of articles analyzed, and aiming to maintain a standard for the comparison of results, initially the 16 typologies identified by Lesage and Wechtler (2012) were used. No exclusions were made on the arising of new typologies resulting from the content analysis carried out.

The first step was to identify the article theme(s) and subjects approached. In that purpose, the research objectives and hypothesis were examined in each article, relating its

theme to the 16 typologies of Lesage and Wechtler (2012). If the theme was not compatible with any of the predetermined typologies, it would be related to a new typology related to its theme.

It is worth mentioning that, in a different way from the studies referred before, this work aims to identify all themes by article, given that many among them comprehend more than one theme in auditing.



**Figure 1** – Research questions

This complete systematic procedure was accomplished to the effect that the questions (Figure 1) were answered with maximum scientific rigor.

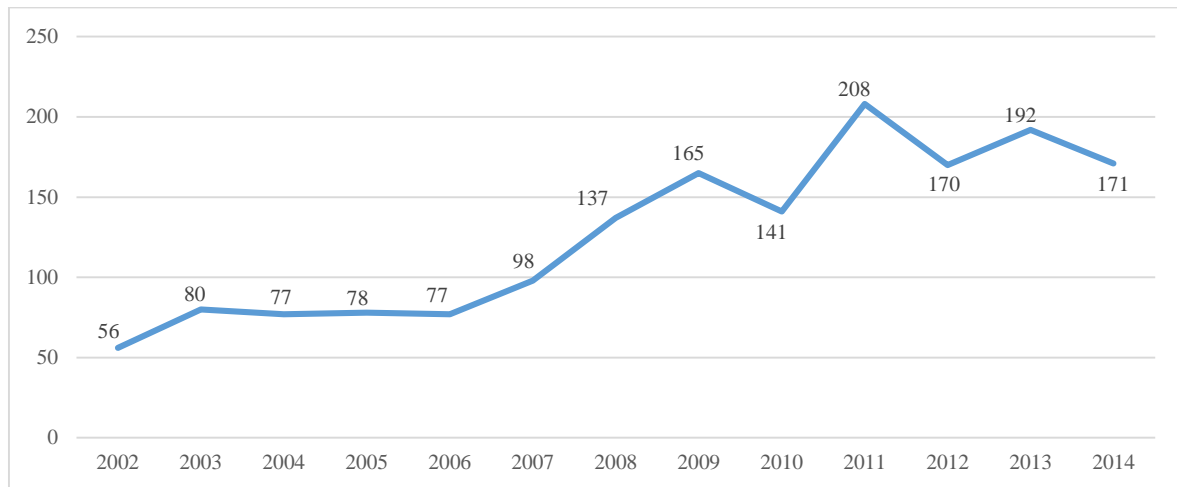
### 3.3 Audit production characteristics

First, we will present the evolution of the production in auditing between 2002 and 2014. Then we will compare the results found in this research and those of Lesage and Wechtler (2012)'s with respect to auditing themes.

#### 3.3.1 Evolution

We noticed that, in the course of the years, the academic investigative production in auditing (Figure 2) has increased, reaching its highest levels in 2011 and then again in 2013, thus showing its significance to the scientific development in the field of study. Results found by Lesage and Wechtler (2012), which present decreasing data over the next three years after the Sarbanes-Oxley Act (SOX) passage, have been questioned, because

this study confirms that during the same period (2003-2005) the production in auditing was practically the same.



**Figure 2** – Quantity of audit papers 2002-2014

### 3.3.2 Themes in auditing

The present work extended the studies on themes in auditing, especially the one of Lesage and Wechtler (2012), from 16 to 22 themes in auditing. The study replaces the theme “Auditor-client relationship” by seven new themes identified: Audit committee, External audit, Internal audit, Internal control, Media coverage in accounting, Research and Socio-economic data of the company. The thematic classification was not limited to identifying just one theme by publication, because the objectives or hypotheses of the analyzed works consisted in articles that could contemplate, as an example, the analysis of internal audit quality and of fraud risk—more than one theme in the same study.

#### 3.3.2.1 Established Themes

Between the 22 themes identified in this study’s results, 7 have been rated as established. This establishment occurred because those themes were in evidence before, in the work of Lesage and Wechtler (2012), and because they demonstrated higher percentages when compared to the aforementioned work. In addition, they are present in every year (2002 a 2014) used in this research’s sampling.

The first theme to be explained is Audit market. The papers refer to factors associated to firms in the audit market. As an example we can point to establishment of



audit firms, studies related to audit firms (Big audit firms and smaller ones), audit fees, fees awarded for audit services, factors concerning mandatory rotation of the audit firm, the monopoly of audit firms, joint audit between audit firms (Caramanis, 2005; Carson, Redmayne, & Liao, 2014; Choi, Kim, Liu, & Simunic, 2008; De Franco, Gavigous, Jin, & Richardson, 2011; Elliott, Ghosh, & Peltier, 2013). This theme had a result 7 times higher and it is third in representativeness (27.6%), present during the whole project's period and in all journals.

Second is the theme Audit report & financial statement users. This theme presents papers referring to factors concerning audit reports and the impacts that may affect the clients of the financial statements. As an example we list the analysis about fair value, as compulsory and voluntary disclosures, adjustments and errors existing in the financial statements, disclosure of financial reports in the internet and presentation of transparency report (Athanasakou & Hussainey, 2014; Carcello & Li, 2013; Chen, Elder, & Hung, 2014; Chi, Dhaliwal, Li, & Lin, 2013; Luypaert & Van Caneghem, 2014). More than doubled, becoming the most identified in this area (36.3%) and it appears every year and all publications.

Thereupon, the third theme refers to Corporate governance. The papers on the subject analyze connections with the process of corporate governance in the organizational world, at equally private, public and nonprofit organizations. As examples, we point out business performance, management earnings, salaries of the high-rank company members, changes in management, cost of capital, directors' connection to the audit committee, voluntary auditing requested by managers and channels to disclose fraud. The subjects addressed are related to factors of corporate governance of the auditors' client, as management of results, capital cost, administrative board and CEO (Azizkhani, Monroe, & Shailer, 2010; Haw, Ho, & Li, 2011; Johnson, Kuhn, Apostolou, & Hassell, 2013; Lim, 2011). It is the second higher percentage (34.4%) and it increased nine times, identified in all years and journals of the study.

The fourth theme is Fraud risk & audit risk. In this matter there are papers related to fraud risk in audited companies and to other risks in which audit firms undergo in delivering their services. Contents in this area: fraud, misstatement risk, time estimated by the auditor for task accomplishment at clients company, audit methodologies and

accounting errors identified by the auditor (Trompeter, Carpenter, Jones, & Riley, 2014; Young & Peng, 2013). A theme that has increased almost six times compared to the previous data (16.7%), present in every year and all journals.

The fifth established theme is International regulation. It refers to the papers addressing aspects concerning legal regulations that define guidelines in auditing. We can give as examples applying and implementing rules for financial statement disclosure, code of ethics, regulatory authority, legal aspects concerning stakeholder protection and legal responsibility of the companies (De George, Ferguson, & Spear, 2013; Gul, Zhou, & Zhu, 2013; Mennicken, 2008). More than tripled when compared to the last study (17.6%), comprehending the whole period and all journals.

Second to last is Liability & litigation, which presents papers involving the legal responsibilities of the auditor and the factors related to litigation between auditor and client, as in risk litigation, insurance hypothesis, sanctions imposed on audit firms, auditor reputation and cost litigation (Bigus, 2012; Boone, Khurana, & Raman, 2011; Kanagaretnam, Krishnan, & Lobo, 2009; Li, 2009; Tarr & Mack, 2013). Percentage tripled in this research (9%) and it is present in all the years in 19-21 journals.

Finally, the theme Non-audit services reveals papers concerning specifically services rendered by audit firms that are not classified as external audit services, for example partner tenure, information about fees, consulting and auditor tenure (Cahan, Emanuel, Hay, & Wong, 2008; Habib, 2012; Koh, Rajgopal, & Srinivasan, 2013). More than doubled its percentage (5.1%), present in all years and in 18-21 journals.

### *3.3.2.2 Declining themes*

Assessing themes in decline, we found eight classified in that situation. The present classification is valid if we take into account they have decreased in representativeness when compared to the previous study carried out by Lesage and Wechtler (2012).

The first theme explained in this section is Audit procedures. It consists of papers related to the procedures used by audit firms in the accomplishment of their services. We can point out audit team brainstorming, analytical procedures, quality of paperwork,

assessment face-to-face of paperwork, electronic evaluation of paperwork, work plan and digital analysis (Bhattacharjee, Moreno, & Riley, 2012; Lynch, Murthy, & Engle, 2009; Trompeter & Wright, 2010). This theme had a decrease of 24% on its representativeness (5.3%), and it was published every year of the study, just in 10-21 journals.

Secondly, we will discuss Audit sampling. This theme presents papers that study, specifically, the selection process of the sample to be audited, used by audit firms during their services. We may cite sample size, error projection rates, mathematical programming models and probability-proportional-to-size (Elder, Akresh, Glover, Higgs, & Liljegren, 2013; Mauldin & Wolfe, 2014). Its representativeness decreased in 80% (0.8%), being present in 9-13 years of the study and in 7-21 publications.

Subsequent, the third theme is Auditor's judgment. It refers to papers that approach subjective factors, which may influence the auditor's judgement in the process of the auditing service. As examples we may point out the existence or lack of materiality, auditors' mood, evaluate competence of subordinates/audit pairs and tasks implementation (Cianci & Bierstaker, 2009; Luippold & Kida, 2012; Pike, Curtis, & Chui, 2013). Decreased in emphasis almost by half (6.8%), despite its presence during all the research period, and was found in 13-21 publications.

The fourth theme is Auditor-auditee contract. It was identified in two publications and it is related to audit contract (Frederickson & Waller, 2005; Jensen & Payne, 2005). This theme had no significant values, present only in 2005 and in a small percentage (0.1%), very different from the results in comparison.

The fifth theme in decline is Education. As elements of this theme we found articles which stress subjects concerning auditors' education, as hours of study, e-learning, scientific production, MBA and plagiarism (Allen & Woodland, 2010; Cheng, 2011; Free, Salterio, & Shearer, 2009; Koh, Scully, & Woodliff, 2011; Stephens, Summers, Williams, & Wood, 2011). There was a decrease in notability in more than 90% (0.5%). Issued in only 5-13 of the researched years and in just 6-21 journals.

The sixth theme is Going-concern opinion. Papers on this theme discuss factors involving the auditor's opinion when issuing reports about the clients' capability to

continue with their businesses' activities, such as opinion of continuity, feasibility and continuation with clients activities (Amin, Krishnan, & Yang, 2014; Blay, Geiger, & North, 2011; Kaplan & Williams, 2013). There was a decrease of 25% regarding its importance in auditing (4.5%), in spite of its presence in the whole period of the study and in 16-21 journals.

Second to last theme is Profession. This theme presents papers which bring evidence of professional aspects of the auditors. As examples we point out auditors specialization in a market segment as the banking or industrial, level of experience, age, educational background, expert sustainability and actuarial (Carrera & Carmona, 2013; Chin, Yao, & Liu, 2014; Dalton, Buchheit, & McMillan, 2014; Ladva & Andrew, 2014). There was a decrease of 10% its importance in auditing (9.9%), and it was evident during the whole period in 20-21 journals.

Finally, the eighth theme is Tax audit, presenting papers related to audit tax services of auditing firms. For example double taxation, billing rates, tax law, tax services and tax incentives (De Waegenaere, Sansing, & Wielhouwer, 2006; Robinson, 2008). There was a decrease of 5% on its importance in auditing (1.9%), and it is present in 11-13 years researched and in 12-21 journals.

### *3.3.2.3 Emerging themes*

As regarding emerging themes, seven were classified in this perspective. It is important highlight that it was the first time that these themes were described in a research about auditing.

The first theme for discussion is Audit committee. In this subject, we group papers which assess subjects related to the unity of the audit committee of companies that may go through external audit, regardless of being a private, public or nonprofit company. As examples we point out knowledge of the financial area, its independence, size, efficacy, role of the committee, tenure of independent member and legal experience (Badolato, Donelson, & Ege, 2014; Carcello, Neal, Palmrose, & Scholz, 2011; Choi, Han, & Lee, 2014; Sharma & Iselin, 2012). It is a new theme emerged from Corporate Governance

which immediately proved to be of great representativeness (11%), being present in the whole project's duration (2002-2014) and in each of the 21 journals.

The second theme is External audit. It presents papers related to audit services and the relationship between the auditor and his/her client during the external audit. We emphasize on this matter the audit services quality, the auditor's independence, customer bargaining power, delay the work, value-added, assurance service, dismissal/resignation of the auditor, ethics, and auditor-client relationships (Conroy, Emerson, & Pons, 2010; Gu, 2013; Rennie, Kopp, & Lemon, 2010; Saito & McIntosh, 2010). New theme, which has the third higher score, with the same result of Audit market (27.6%). It appears in the whole period and all journals.

Thereupon, the third theme is Internal audit. This theme concerns papers which describe studies about the internal audit unit of companies susceptible to audit, regardless of being a private, public or nonprofit company. As examples we refer to outsourcing of internal audit, continuous monitoring, accounting knowledge, performance, competence, investment, management training ground, experience, ethics and effectiveness (Alic & Rusjan, 2011; Cohen & Sayag, 2010; Desai, Roberts, & Srivastava, 2010; Prawitt, Sharp, & Wood, 2012). It is a new theme not previously identified as showing its relevance (4.1%). It is included in every year of the research except for 2006, and published in 14-21 publications.

The fourth theme in debate is Internal control. In this theme, the papers relate to internal control unit of companies susceptible to audit, regardless of being a private, public or nonprofit company. The subthemes are as follows: internal control deficiencies, material weaknesses, volunteer management reporting, effectiveness, human resources, quality, information technology, public reporting, cost, power, reliability, training, transfer of information to the auditor, investment and efficiency (Bedard & Graham, 2011; Choi, Choi, Hogan, & Lee, 2013; Ettredge, Li, & Sun, 2006; Krishnan, Rama, & Zhang, 2008). It is a new theme not previously described, and it emerges with a good representativeness (6%). Present in 11-13 years of the research and in 17-21 journals.

The fifth emerging theme is Media coverage in accounting, which presents papers connected to news coverage about matters on the company's accounting office, whether

private, public or nonprofit companies. For example scandal exposure by the press, disclosure of financial reports by the companies in printed press and information about the company's image (Andon & Free, 2014; Dee, Lulseged, & Zhang, 2011). New theme that emerges in a gradual manner (0.8%), present in 8-13 years and in 8-21 journals.

The second to last theme to be presented is Research, in which we determined the existence of papers object of analysis for the understanding of the development of scientific dynamics and of thematic areas. As examples we point out the study of literature review in auditing, thematic, bibliometry and research methodology (Cram, Karan, & Stuart, 2009; Lesage & Wechtler, 2012; Napier, 2006; Uysal, 2010). It is a new theme identified by the research, revealing its relevance (3.3%). It appears during the whole period in 15-21 journals.

Finally, the last theme is Socio-economic data of the company, which presents papers assessing the economic and social aspects of the companies, whether public, private, or nonprofit. For example its size, family companies, company age, operational complexity, pay higher wages, location, insolvency, company value and classification aspects as public, private, nonprofit (Carson & Fargher, 2007; Choi, Kim, Qiu, & Zang, 2012; Clatworthy & Peel, 2013; Humphrey & Miller, 2012; Vermeer, Edmonds, & Asthana, 2014). A new theme not previously identified, showing its significance in the field (19.5%). It is present in the whole period and in all journals.

This chapter presented the themes established, declining and emerging in auditing, besides updating the thematic importance collected in the analysis of more than one decade of the post-SOX era in scientific research.

### **3.4 Applications**

Now the thematic trends in audit research will be presented, as well as the thematic contribution of each journal, highlighting the Auditing-a Journal of Practice & Theory, Accounting Review and Contemporary Accounting Research, and followed by the association of themes in auditing.

### 3.4.1 Thematic trends on audit research

The Audit market has suffered a significant change after the passage of the Sarbanes-Oxley Act (SOX), and it would be no different, considering the impacts on scientific research in the area. Proof of that is an increasing academic production in auditing from 2002 to 2014 illustrated on Figure 1.

Lesage and Wechtler (2012) state that the “SK typology” proposed by Smith and Krogstad (1984) is deficient because it is more than 30 years old and so it does not reflect the present themes in auditing due to the changes occurred in this field. Notwithstanding the important contribution of Lesage and Wechtler (2012), they grounded their work on thematic trends in auditing in pre-Sox era, having extended their research until 2005.

Even though analyzing the short post-SOX period, their results were not representative of the themes in auditing after SOX enactment. The present study fills this gap left by the authors and introduces a new topic on audit research – the association of themes in auditing.

Table 2 presents the themes identified in the research and their impact over the years. The horizontal analysis highlights the three most relevant representations of the theme, in a shading off effect, and it demonstrates the evident decrease of the theme during this time (darker for greater amount).

As may be seen in Table 2 the time from 2011 to 2014 was significant to 19 themes, except to “Auditor’s judgment”, “Auditor-auditee contract”, “Internal audit” and “Non-audit services”, that is, during this period themes reached their highest level in publication, demonstrating that such themes have been much discussed by researchers recently.

The theme “Non-audit services” had a soft decrease, and the theme “Auditor-auditee contract”, accredited by a previous research, lost expression in time until there was no more mention of it since 2005.

**Table 2 – Popularity of themes on audit research**

Themes	Abbrev.	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Audit committee	ACOM	6	9	9	12	6	14	19	18	12	17	15	22	22	181
Audit market	MRKT	14	22	19	30	25	27	37	40	32	49	46	50	65	456
Audit procedures	PROC	4	7	7	4	4	6	7	9	10	12	7	6	4	87
Audit report & financial statement users	REPO	24	27	30	30	27	31	57	61	42	79	61	66	64	599
Audit sampling	SAMP	0	1	1	1	0	0	2	1	1	0	1	3	3	14
Auditor's judgment	JUDG	7	13	3	9	6	8	10	11	7	11	11	11	5	112
Auditor-auditee contract	CONT	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Corporate governance	CGOV	18	18	26	29	21	35	57	61	44	77	63	61	58	568
Education	EDUC	0	0	1	0	0	0	0	2	1	3	0	1	0	8
External audit	EXTE	15	26	22	17	24	28	34	43	46	62	53	53	33	456
Fraud risk & audit risk	RISK	11	16	11	14	10	18	22	27	28	37	22	29	31	276
Going-concern opinion	GCOP	3	4	3	4	3	4	9	8	6	7	5	11	7	74
Internal audit	INTE	1	2	5	1	0	3	6	10	8	9	8	8	6	67
Internal control	ICON	0	1	0	1	4	7	12	14	6	18	15	15	6	99
International regulation	INTR	4	10	6	15	13	13	21	26	34	35	31	48	34	290
Liability & litigation	LTIG	9	7	6	13	9	9	8	13	17	13	19	17	8	148
Media coverage in accounting	MEDI	0	1	0	1	2	0	1	0	1	2	3	0	2	13
Non-audit services	NAS	3	7	8	4	11	7	5	8	4	6	6	8	7	84
Profession	PROF	8	8	6	8	4	11	10	16	15	27	15	15	20	163
Research	RESE	2	2	1	1	3	2	3	5	5	8	8	9	6	55
Socio-economic data of the company	SEDC	6	9	11	10	15	25	25	25	24	54	40	47	30	321
Tax audit	TAX	0	2	3	0	4	3	2	1	1	3	5	2	5	31
Total		56	80	77	78	77	98	137	165	141	208	170	192	171	1650

Of the studied themes, Audit report & financial statement users (599), Corporate governance (568), Audit market (456), External audit (456), Socio-economic data of the company (321), International regulation (290) and Fraud risk & audit risk (276) were the most significant in auditing. Particularly, 2011 was a prominent year, with 10 themes and the highest number of publications.

### 3.4.2 Thematic contribute of journals

Table 3 presents the major contributions of the scientific journals for each theme identified in the research. The three biggest representations of the theme in the scientific journals are highlighted by the use of shading off effect, demonstrating reduction of theme evidence during time (the darker the higher quantity).



**Table 3** – Most contributory journals

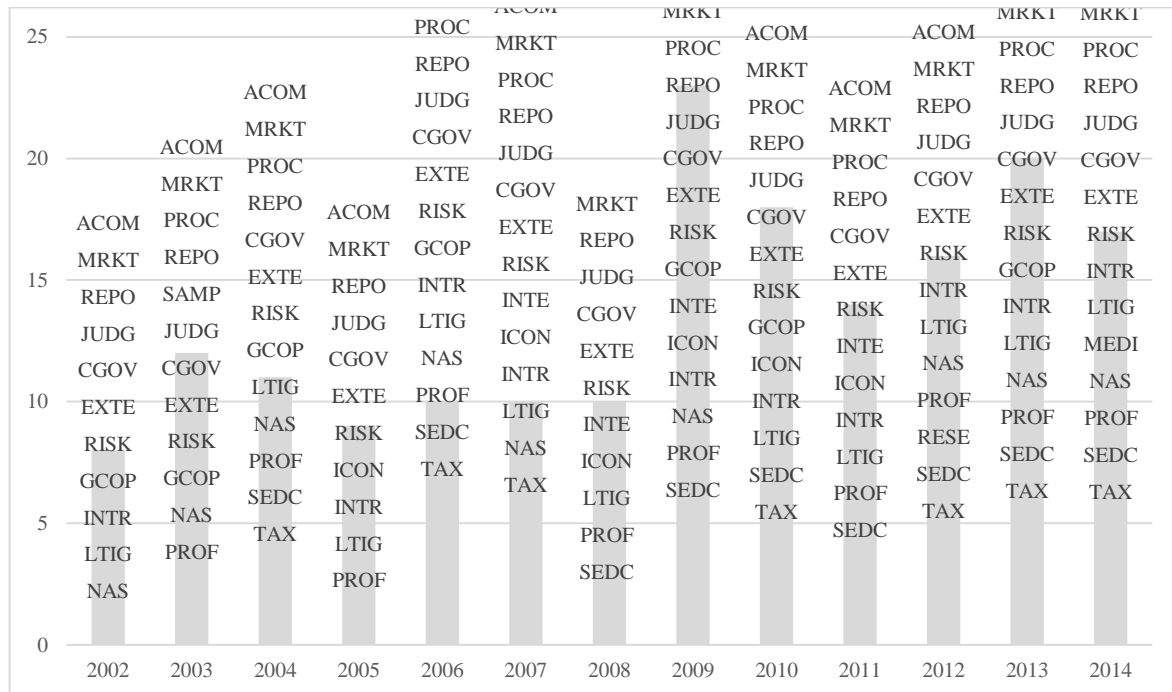
Themes	Abbrev.	ABS	ABR	AF	AAAJ	AH	AOS	AR	AJBM	AJTP	AAR	BFP	CAR	CGIR	EAR	JAIE	JAPP	JAR	JBF	JBE	JBFA	RAS	Total
Audit committee	ACOM	1	6	8	1	5	5	24	4	25	10	1	16	23	7	4	13	4	4	10	8	2	181
Audit market	MRKT	7	12	20	2	27	14	52	6	118	9	2	63	6	13	20	26	22	8	7	11	11	456
Audit procedures	PROC	1	0	1	0	2	4	17	0	46	0	1	13	0	1	0	0	1	0	0	0	0	87
Audit report & fin. stat. users	REPO	16	12	20	6	36	19	72	21	96	19	8	61	17	19	28	39	30	8	36	20	16	599
Audit sampling	SAMP	0	0	0	0	2	0	1	0	7	0	1	1	0	0	0	1	0	0	1	0	0	14
Auditor's judgment	JUDG	0	3	4	0	3	7	24	0	37	0	1	14	0	1	0	2	6	0	9	0	1	112
Auditor-auditee contract	CONT	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
Corporate governance	CGOV	4	10	26	6	18	25	54	27	57	13	4	61	57	14	30	27	23	21	59	21	11	568
Education	EDUC	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	3	0	0	0	8
External audit	EXTE	3	12	12	4	22	26	57	7	112	15	7	51	3	13	12	18	19	4	49	6	4	456
Fraud risk & audit risk	RISK	7	2	6	1	16	26	32	4	65	4	7	29	5	2	4	8	20	4	21	7	6	276
Going-concern opinion	GCOP	2	0	4	0	3	3	9	0	26	2	1	8	1	1	3	3	5	0	2	0	1	74
Internal audit	INTE	0	1	6	1	4	3	5	14	13	3	4	7	2	0	0	2	0	0	2	0	0	67
Internal control	ICON	0	0	0	0	11	1	13	2	28	1	1	11	2	2	9	4	4	3	2	2	3	99
International regulation	INTR	13	7	6	9	30	14	27	6	50	12	7	15	6	12	18	20	11	4	14	5	4	290
Liability & litigation	LTIG	0	1	0	2	5	4	19	4	39	1	1	23	1	6	6	9	9	5	7	1	5	148
Media coverage in accounting	MEDI	0	0	1	2	0	1	1	0	0	1	0	3	0	0	0	1	3	0	0	0	0	13
Non-audit services	NAS	2	1	4	0	1	2	11	0	25	1	2	15	2	1	2	2	6	0	1	4	2	84
Profession	PROF	1	2	7	8	11	15	18	2	51	3	2	12	0	1	2	1	5	6	12	1	3	163
Research	RESE	0	1	2	4	4	8	1	1	16	2	1	3	2	3	3	0	0	0	4	0	0	55
Socio-economic data of the company	SEDC	7	10	11	6	16	13	22	15	58	15	2	24	21	17	14	17	12	16	13	6	6	321
Tax audit	TAX	1	0	0	1	2	1	10	1	1	0	0	7	0	0	0	1	1	0	3	2	0	31
Total		32	35	56	31	79	94	178	51	330	47	32	171	65	46	64	67	64	28	115	36	29	1650

There is evidence of publication from Auditing-a Journal of Practice & Theory (AJTP) on most of the themes in audit (21-22 themes), followed by Contemporary Accounting Research (CAR; 20-22) and next by Accounting Review (AR; 19-22). Those three journals are responsible for taking the leadership in 19-22 of the identified themes; the other journals have a smaller sampling per area, though not meaning they are less important to scientific development in auditing.

Because Auditing-a Journal of Practice & Theory, Accounting Review and Contemporary Accounting Research are the journals with the highest number of publications in auditing, an analysis of each journal was carried out comprehending annual

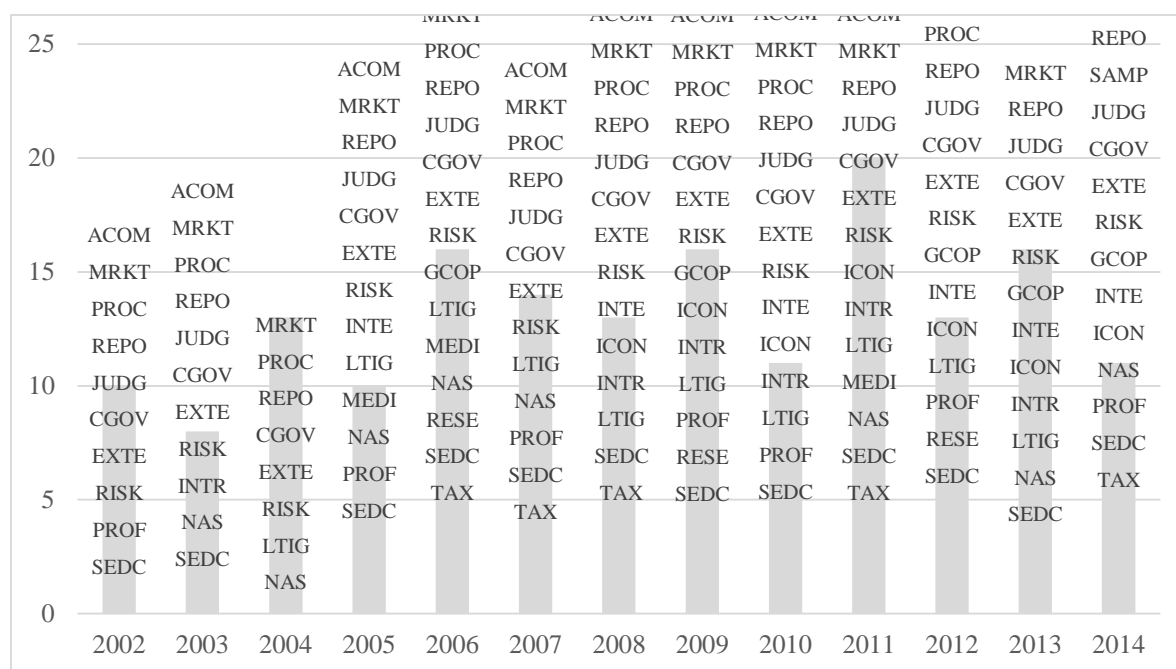


Accounting Review has the second highest academic production in auditing. It was the journal that most contributed to Tax audit (TAX), as seen in Table 3, with an average of 13 themes published per year (Figure 4).



**Figure 4** – Production in volume (by theme) – *Accounting Review*

Contemporary Accounting Research stands out as the third journal with the highest number of researches in auditing, taking lead in two particular themes (Table 3): Corporate governance (CGOV) and Media coverage in accounting (MEDI). It includes an average of 13 themes published annually. Accounting Review and Contemporary Accounting Research had the same highlights over the years comprehending the themes (Figures 4 and 5): Audit market (MRKT), Audit report & financial statement users (REPO), Corporate governance (CGOV), External audit (EXTE) and Fraud risk & audit risk (RISK).



**Figure 5** – Production in volume (by theme) – *Contemporary Accounting Research*

Such results prove that Auditing-a Journal of Practice & Theory, Accounting Review and Contemporary Accounting Research play an important role for research development in auditing, strengthening well-established and current themes in the area with new thematic topics. These journals approach, because they disclose several themes in auditing, confirm the reasoning of Power (2003) in favor of avoiding being hostage to professional concepts in auditing. In that effort, journals shall be able to publish concepts not oriented to the auditors' professional practice and that were not identified in the studies of Smith and Krogstad (1984, 1988, 1991), Maijoor *et al.* (2000) and Lesage and Wechtler (2012).

### 3.4.3 Thematic association

Table 4 presents the association between themes by a statistic incidence, something not yet seen in audit researches. In the horizontal analysis, the three highest percentages were evidenced by relating one theme to others using shading the off effect, illustrating the reduction of the theme relation to other themes (darker for higher quantity), using the seven major themes in auditing as guidelines (Table 3). The three most important associations are presented here (decreasing order):

- Audit report & financial statement users (REPO) – the results show that researchers, while performing studies about Audit report & financial statement users, associate them mainly to Corporate governance (CGOV) in 38 per cent of cases, then to Audit market (MRKT; 29%) and finally to External audit (EXTE; 23%).
- Corporate governance (CGOV) – the second most identified theme in auditing is related mainly to Audit report & financial statement users (REPO; 40%), next to Audit market (MRKT; 29%) and further to Socio-economic data of the company (SEDC; 22%);
- Audit market (MRKT) – as to Audit market, researchers relate it to External audit (EXTE; 39%), Audit report & financial statement users (REPO; 38%) and Socio-economic data of the company (SEDC; 25%), in this order;
- External audit (EXTE) – this is one of the new themes that emerged from the present research and is related to Audit market (MRKT; 39%), Audit report & financial statement users (REPO; 30%) and Corporate governance (CGOV; 22%);
- Socio-economic data of the company (SEDC) – another new theme and related to the themes: Corporate governance (CGOV; 39%), Audit market (MRKT; 36%) and Audit report & financial statement users (REPO; 34%);
- International regulation (INTR) – when researchers write about INTR, they also refer to Audit report & financial statement users (REPO; 36%), Corporate governance (CGOV; 22%) and Socio-economic data of the company (SEDC; 20%);
- Fraud risk & audit risk (RISK) – a very important theme for stakeholders and usually associated to scholars of Audit report & financial statement users (REPO; 24%), Audit market (MRKT; 23%) and External audit (EXTE; 21%), respectively.

Corporate governance (CGOV) emerges as being seven times the most associated between others. This means that when researchers write about auditing they are not only worried about technical themes or legal matters, but they are also trying to understand aspects related to Corporate governance concerning the auditors' clients.

**Table 4 – Thematic association**

	ACOM	MRKT	PROC	REPO	SAMP	JUDG	CONT	CGOV	EDUC	EXTE	RISK	GCOP	INTE	ICON	INTR	LTIG	MEDI	NAS	PROF	RESE	SEDC	TAX	Total
ACOM		31 17%	1 1%	58 32%		1 1%		98 54%		25 14%	12 7%	2 1%	14 8%	12 7%	17 9%	6 3%	1 1%	9 5%	2 1%	1 1%	36 20%	1 1%	181
MRKT	31 7%		5 1%	173 38%	4 1%	10 2%	2	128 28%	1	178 39%	64 14%	24 5%	6 1%	23 5%	54 12%	54 12%	3 1%	38 8%	68 15%	6 1%	116 25%	2	456
PROC	1 1%	5 6%		5 6%	3 3%	23 26%		5 6%		20 23%	45 52%	3 3%	1 1%	2 2%	4 5%	2 2%		1 1%	10 11%	2 2%	4 5%		87
REPO	58 10%	173 29%	5 1%		1 4%	24 4%		225 38%		138 23%	67 11%	27 5%	6 1%	33 6%	103 17%	50 8%	7 1%	36 6%	37 6%	6 1%	109 18%	8 1%	599
SAMP		4 29%	3 21%	1 7%		6 43%		1 7%		1 7%	7 50%	1 7%			2 14%	2 14%				1 7%	1 7%		14
JUDG	1 1%	10 9%	23 21%	24 21%	6 5%			10 9%		28 25%	28 25%	5 4%		3 3%	11 10%	5 4%			9 8%	5 4%	5 4%	1 1%	112
CONT		2 100%						1 50%		1 50%						1 50%			1 50%		1 50%		2
CGOV	98 17%	128 23%	5 1%	225 40%	1 2%	10	1		1	97 17%	55 10%	16 3%	20 4%	33 6%	63 11%	27 5%	4 1%	18 3%	26 5%	13 2%	126 22%	12 2%	568
EDUC		1 13%						1 13%		4 50%									1 13%	1 13%	1 13%		8
EXTE	25 5%	178 39%	20 4%	138 30%	1 6%	28 6%	1	97 21%	4 1%		57 13%	20 4%	12 3%	16 4%	55 12%	53 12%	2 11%	51 13%	59 13%	12 3%	71 16%	5 1%	456
RISK	12 4%	64 23%	45 16%	67 24%	7 3%	28 10%		55 20%		57 21%		9 3%	7 3%	19 7%	22 8%	32 12%	1 2%	6 2%	26 9%	5 2%	28 10%	4 1%	276
GCOP	2 3%	24 32%	3 4%	27 36%	1 1%	5 7%		16 22%		20 27%	9 12%			1 1%	7 9%	8 11%	1 1%	8 11%	6 8%	2 3%	14 19%	2 3%	74
INTE	14 21%	6 9%	1 1%	6 9%				20 30%		12 18%	7 10%			5 7%	5 3%	2 3%		4 6%	2 3%	1 1%	14 21%		67
ICON	12 12%	23 23%	2 2%	33 33%		3 3%		33 33%		16 16%	19 19%	1 1%	5 5%		21 21%	4 4%		1 1%	4 4%		30 30%		99
INTR	17 6%	54 19%	4 1%	103 36%	2 1%	11 4%		63 22%		55 19%	22 8%	7 2%	5 2%	21 7%		27 9%	2 1%	7 2%	12 4%	12 4%	58 20%	4 1%	290
LTIG	6 4%	54 36%	2 1%	50 34%	2 1%	5 3%	1	27 18%		53 36%	32 22%	8 5%	2 1%	4 3%	27 18%		3 2%	3 2%	13 9%	3 2%	22 15%	1 1%	148
MEDI	1 8%	3 23%		7 54%				4 31%		2 15%	1 8%	1 8%			2 15%	3 23%					1 8%		13
NAS	9 11%	38 45%	1 1%	36 43%				18 21%		51 61%	6 7%	8 10%	4 5%	1 1%	7 8%	3 4%			6 7%	1 1%	7 8%	3 4%	84
PROF	2 1%	68 42%	10 6%	37 23%		9 6%	1	26 16%	1	59 36%	26 16%	6 4%	2 1%	4 2%	12 7%	13 8%		6 4%		3 2%	33 20%	6 4%	163
RESE	1 2%	6 11%	2 4%	6 11%	1 2%	5 9%		13 24%	1 2%	12 22%	5 9%	2 4%	1 2%		12 22%	3 5%		1 2%	3 5%		6 11%		55
SEDC	36 11%	116 36%	4 1%	109 34%	1 2%	5 3%	1	126 39%	1	71 22%	28 9%	14 4%	14 4%	30 9%	58 18%	22 7%	1 2%	7 10%	33 10%	6 2%		7 2%	321
TAX	1 3%	2 6%		8 26%		1 3%		12 39%		5 16%	4 13%	2 6%			4 13%	1 3%		3 10%	6 19%				31
Total	181	456	87	599	14	112	2	568	8	456	276	74	67	99	290	148	13	84	163	55	321	31	1650

### **3.5 Conclusion, limitations, and future research**

As part of the basis for the development in auditing, themes on this matter, during more than three decades of study, have been of great importance to the academic and professional development of this area worldwide. However, because of important facts in the contemporary world, which affect considerably the studies related to auditing, as the Sarbanes-Oxley act, it has been observed that previous researches are outdated, other than their relevance to the academic and professional universe.

This research aims to correct this gap by studying the themes about auditing after the post-SOX period, identifying the changes occurred in the thematic areas and relating their association in auditing.

The results placed seven established themes in auditing, which are Audit market, Audit report & financial statement users, Corporate governance, Fraud risk & audit risk, International regulation, Liability & litigation and Non-audit services. Despite the changes that took place after the period of the SOX enactment, these themes continued being part of the researches. They were tracked in every year of the sampling, and there was an evolution in their representativeness percentages when compared to previous studies.

After the SOX period, the results presented eight themes, which keep losing strength in auditing researches. They are Audit procedures, Audit sampling, Auditor's judgment, Auditor-auditee contract, Education, Going-concern opinion, Profession and Tax audit. The reason for their decline is the fact that their representativeness percentages have decreased in the results presented in comparison to the existing literature.

As a new element, the current study managed to evidence the seven themes that emerged after the SOX enactment. These themes were not indexed as auditing themes in former researches in academic literature. They are Audit committee, External audit, Internal audit, Internal control, Media coverage in accounting, Research and Socio-economic data of the company.

Another important contribution of this research was identifying the thematic associations in auditing. Now researchers will improve their understanding of what really occurs in the investigations when they acknowledge, for example, that Corporate

governance is not only the second most distinguished theme in auditing, but also the most related to other themes. It is a demonstration that even more than understanding technical and legal aspects in auditors' profession, researchers are concerned about factors that affect the auditors' clients.

Finally, this study managed to accomplish the objectives proposed, bringing up to date the existing themes in auditing literature, and presenting the existing connections between them. However, it has limitations as well as every other study. The first of them is having used only publications from *Web of Science* as its sample size. Another limitation is due to the quantity of scientific journals analyzed which were limited only to 21, hiding from its results the journals which had less than one per cent of their publications analyzed.

We emphasize that the results found here are not definitive. Therefore, it is necessary to carry out new researches in order to check if the factors previously mentioned will remain valid in the future. It is of great importance that conferences should debate the reason for the possible lack of interest of researchers about the themes indexed in this study as declining. By the passage of the years, it is common to have establishment, declining and emerging of new themes. Nevertheless, in benefit of auditing history, researches and professionals of the area must assess these changes and try to add a new profile to the themes of the past, so these thematic areas will be remembered and not forgotten in a state of scientific limbo.

In conclusion, we question ourselves if the themes rated as established will remain in the future the same way they were presented in the period of this research; and if the emerging themes will become established or will decline just as a scientific short trend from that time. Also if the declining themes will have the strength to emerge again or if they will not be part of the scientific journals. At last, we question if by the SOX enactment the themes in evidence were the only ones to have the merit to be published because they were not recurrent in scientific journals.

Certainly, those are quests that researchers will be further concerned to answer in their new studies, in order to give dynamism and progress to auditing researches in the future.



## **4. PAPER 3 – RESEARCH IN AUDITING: MAIN METHODOLOGIES**

### **4.1 Introduction**

Smith and Krogstad (1984), were the precursors in characterizing methodologies in accounting research. They conducted a study with 39 publications in *A Journal of Practice and Theory (AJPT)* substantiating, in one of the results, the research approaches found in their studies. Later, the same authors attained new advances studying first 113 and next 162 publications (1988, 1991), of the same journal about which their first paper performed, this time extending the results to the following methodological approaches: empirical, experimental, modeling, normative/prescriptive, survey, review/historical. Researchers, throughout the years, have been using Smith and Krogstad's findings to conduct bibliometric and scientiometric studies in accounting, such as: Chan, Seow, and Tam (2009), Coyne, Summers, Williams, and Wood (2010), Maijoor, Meuwissen, and Quadackers (2000) and Stephens, Summers, Williams, and Wood (2011).

As the study of research approaches on academic production in auditing is in its third decade, the following questions may be pertinent: Specifically, until the present moment, what do we know about the methodologies studied in auditing? Which is the main research method used in auditing? Which are the research methods used in main journals in auditing? Which are the main types of collection of primary and secondary data used in audit research? Which are the predominant investigation methods in auditing studies? Which are the main types of data analysis used in the scientific area in auditing?

These questions are motivated, in first place, by the creation of new important journals in auditing, throughout the years, and of the publication rules imposed by them. After all, scientific publication is not only a mere communication from the academics to the market. In many countries there is severe pressure so that educational institutions publish more and more. With a variety of journals indexed in databases, it is necessary that novel researchers, and even senior ones, master the knowledge considered of importance on research methodology in the field.

Second, in audit literature, information on collecting and analyzing data in academic production in auditing itself is undisclosed, i.e., we know which are the main

investigation methods used in audit research, however, we do not know detailed information about its methodologies.

Thus, we suggest outlining something yet not seen in accounting literature, which is, the accomplishment of a study concerning the research methodologies in auditing, specifically in Fraud risk & audit risk, characterizing not only the methods, but also how to collect and analyze the data used in the investigations.

The objective of this study is to identify which are the main research methodologies in auditing, specifically in publications concerning Fraud risk & audit risk. Therefore, 276 publications on Fraud risk & audit risk have been assessed, comprehending 21 journals, during the period from 2002 to 2014 by means of a content analysis of the methodology applied in the studies.

This study contributes to the existing literature in auditing, specifically on Fraud risk & audit risk in organizations in the following way: starting from a methodological perspective we assessed the main research methodologies on Fraud risk & audit risk using a resource not yet seen in accounting literature, which is the selection by theme by means of a content analysis of the objectives and hypotheses of the researches. Diversely from other studies on fraud in which themes are selected using keywords to detect the subject fraud in auditing publications.

Those previous studies related to research methodologies in accounting will be presented over the next section. Later, the methodological procedures used in the study will be described. The three following sections will discuss the results and their appropriate analysis. As for the subsequent section, a debate concerning the results will be displayed. Finally, the study will present its conclusions, limitations and some implications for future researches.

## **4.2 Background and related researches**

The previous research indicates analytical, archival, empirical, experimental and survey as the main investigation methods used in accounting research, as may be seen in the studies of Brown, Gardner, and Vasarhelyi (1987), Chan *et al.* (2009), Coyne *et al.* (2010), Maijor *et al.* (2000), Smith and Krogstad (1984, 1988, 1991), Solomon and

Trotman (2003) and Stephens *et al.* (2011). However, the researches are centered in the types of methods and neglect other data pertinent to the methodology, as its primary and secondary aspects and the types of data analysis used in the researches.

#### 4.2.1 Studies on the types of methodology

Gradually researchers started to worry about studying the methodological aspects of the investigations in accounting. After all, scholars have been suffering more and more pressure to publish their work in highly qualified journals (De Villiers & Dumay, 2013) and, therefore, the journals have been more and more selective in the assessment process by blind revision.

By analyzing the methodologies used in Fraud risk & audit risk researches, it will be possible to help researchers to increase the probability of approval of their work, once the authors know the methodological profile of the journal they intend to submit their studies.

Smith and Krogstad (1984) carried out a study toward the citation analysis of 39 articles in *A Journal of Practice and Theory* (AJPT), referring to the period from 1981 to 1984, concerning themes in auditing such as: professional issues, audit reports and approaches. Their results presented the main investigation methods identified in audit studies (experimental, modeling, normative/prescriptive, review and survey), which were arranged by theme. Later, in 1988, the same authors extended their research for the period from 1981 to 1988, analyzing 113 publications of the same journal. They found a significant increase in the studies concerning the investigation methods experimental and modeling, and a decrease in the use of survey and review/historical. New studies were carried out again by the authors (1991) on the same journal, this time including 162 papers, with prominence to the investigation methods experimental and survey, along with modeling which presented great increase in the period.

Brown *et al.* (1987) carried out a study concerning three journals (AR), *Journal of Accounting Research* (JAR) e *Organizations and Society* (AOS)) during the years from 1976 to 1984. The results emphasized studies which had used the analytical method, followed by survey and empirical methods. It should be stressed out that such results were

presented throughout an analysis of the research methodologies referring to each of the journals assessed. Its scope presented results of the investigation methods over the theme in accounting, psychology, multidisciplinary, management, sociology, political science, economics, finance, mathematics, engineering, and statistics, among others.

Maijoor *et al.* (2000) followed the same line of reasoning of Smith and Krogstad (1984, 1988, 1991) and presented a study which included 949 papers published in 23 journals of accounting and auditing in the period from 1990 to 1997. The authors presented a distinction between the themes investigated by the papers of North American and European origins. As main investigation methods on the North American studies they presented the experimental and empirical methods, while for the European studies there was a predominance of the review/historical method.

Solomon and Trotman (2003) analyzed 670 works in auditing which had been published in five accounting journals (Accounting Review (AR), Contemporary Accounting Research (CAR), Journal of Accounting & Economics (JAE), Journal of Accounting Research (JAR), Organizations and Society (AOS)) from the year of 1976 to 2000. In his study it is evidenced that the most used investigation methods involving these journals are: experimental, archival, analytical and survey.

Chan *et al.* (2009) carried out a research using ProQuest's Dissertations and analyzed 247 dissertations, which had been concluded during the period from 1999 to 2003. In this research, the authors evidenced the investigation methods in relation to the themes of auditing, finance, management, systems, taxes, among others. Its results demonstrated that the archival method was the most observed in the researches, followed by experimental, survey and modeling.

Coyne *et al.* (2010) carried out a study comprehending 11 accounting journals, concerning the period from 1990 to 2009. Stephens *et al.* (2011) analyzed the productivity of the graduates in accounting doctoral programs, in two periods: three years after the graduation and six years after the graduation. Both of the studies divided papers by theme (auditing, finance, fiscal, management, systems of accounting information) and by investigation method (analytical, archival and experimental).

This chapter presented the main studies related to the analysis of types of investigation methods found in accounting researches, enabling us to answer the following question: “What do we know so far about the methodologies studied in auditing?”. After that, we will outline the methodology used in the present research.

### **4.3 Research methodology**

#### **4.3.1 Content analysis strategy**

Distinctively from studies based on title, keywords and abstracts (Cruz & Teixeira, 2010; Fetscherin & Usunier, 2012; Lesage & Wechtler, 2012; Porte, Saur-Amaral, & Pinho, 2015; Silva & Teixeira, 2009; Uysal, 2010), the present research is grounded, primarily, on the analysis of the objectives, hypotheses and methodologies of the publications indexed in the Social Science Citation Index (SSCI) of Web of Science since 2002, the year of the passage of the Sarbanes-Oxley Act (SOX), to 2014, through a content analysis. The decision of using as research source the database of the Institute for Scientific Information (ISI), Web of Science™ Core Collection, was because it is considered one of the most important sources of information in scientific research. It was used in several studies, such as: Duan (2011), Kostoff, Briggs, Rushenberg, Bowles, Icenhour, Nikodym, Barth, and Pecht (2007), Kostoff, Tshiteya, Bowles, and Tuunanen (2006), Krogstad and Smith (2003) and Nerur, Rasheed, and Natarajan (2008). The period of the sample initiates in 2002, in view of the worldwide impact suffered by auditing after the scandals involving Enron's financial reports audited by Arthur Andersen, which culminated in the creation of the SOX, and ends in 2014, because the data were collected in the 18th February of 2015. Therefore, the papers published in 2015 were excluded because the research begun while this year was still in progress.

The first step consisted of using the word “audit\*” so that we could find its derived terminologies as audit, auditing, auditor or auditors in the blank "Topic" (it involves title, abstract and keyword) limiting the period of the research from 2002 to 2014 in the citation database of SSCI. After this procedure, the refining presented 25,530 results.

The second step was to select the types of documents, refined by the groups Article and Review, this way decreasing to 23,416 results.

In the third step, the research area Business Economics was selected as the group possessing the most resembling characteristics to the considered theme. This was observed after the accomplishment of a pre-test, which generated an indicator of 2,846 results distributed in 385 journals. Nonetheless, we should point out that although we had selected the aforesaid theme, other areas in auditing emerged for the reason that a publication may be classified in more than one area. Therefore, in order to maintain the range of the research, these new auditing areas that appeared after the selection of the group were not excluded. If this exclusion was to be made, it would also remove publications of the selected area, Business Economics.

The fourth step was to transfer the 2,846 result database created to EndNote X5 and to download all the articles so that a systematic literature review was carried out aiming to evidence the results exclusively of auditing and to exclude outliers (180). The outliers found correspond to the publications not related to auditing, or which, despite their link to this area, had been removed by the journals publisher. When in doubt, we used the text's body to identify the publication's field of study.

The fifth step was to organize the 2,666 results found by their publication source. However, 135 journals presented just one publication, therefore, only those with at least one percent of the total (of 2,666) were selected, i.e., we selected the journals which included at least 26 publications in the period from 2002 to 2014, creating a new database of 1,650 results comprehended in 21 journals, as may be seen in Table 1. The following hypotheses were used for journal selection:

- a) The journal should have at least two editions per year (y);
- b) In each edition, it should have at least one publication in auditing (w);
- c) Period of analysis of the study, 2002-2014 = 13 (z).

By using the previously mentioned principle, follows on the analysis below:  $Y \times W \times Z \Rightarrow 2 \times 1 \times 13 \Rightarrow$  corresponding to a value of 26 articles in auditing published by a journal throughout 13 years. This value corresponds approximately to one percent of the total of the analyzed publications ( $2,666 \times 1\%$ ).

The sixth step was to transfer the created database from EndNote X5 with 1,650 articles to NVivo 11. We analyzed the objectives and hypotheses of the indexed publications to detect themes pertinent to the field of study of each article, using the study of Lesage and Wechtler (2012) as the guiding principle for the cataloguing of the themes found.

#### 4.3.2 Research coding methods

Due to the great amount of articles that had been analyzed in NVivo 11, and aiming to maintain a standard for the comparison of the results, we used originally the 16 typologies found by por Lesage and Wechtler (2012), not making any exclusions of new typologies arisen from the analysis of content carried out.

The first step consisted in identifying which was(were) the theme(s) of the article. The research objectives and hypotheses of each one of articles were examined, relating their themes with the 16 typologies of the study of Lesage and Wechtler (2012). If the theme did not conform to one of the predetermined typologies, a new typology would be created for the article considering its subject. It should be stressed that, diversely to the previous referred studies, this one intended to identify all the existing themes in each article, after all, many articles are written comprehending one or more themes in auditing.

The second step was to select the publications related to the theme Fraud risk & audit risk, in order to create a sample, which served as database for this study comprehending 276 scientific articles.

The third step was to carry out an analysis of content of these 276 articles. Each article's methodology section was analyzed aiming to characterize the existing research methodologies by examining the research methods used, the types of collection of primary and secondary data, the investigation methods and the types of data analysis within the articles.

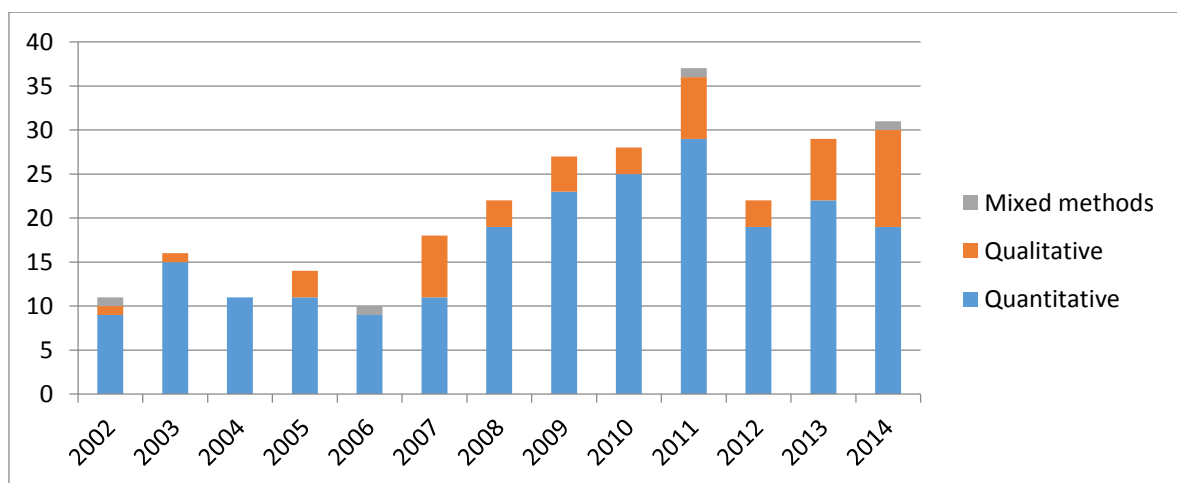
This completely systematic procedure was carried out so that the investigative questioning was answered with maximum scientific rigor. The identified investigation methods were classified based on the studies of Smith and Krogstad (1984, 1988, 1991) and of Coyne *et al.* (2010) regarding the following specifications:

- a) Analytical – studies that implicate the construction, development or argument of theoretical models through mathematical resources;
- b) Archival – studies that utilize literature review as the main method for the study's analysis and conclusion;
- c) Empirical – studies that consist in analyzing real data from companies, found in data sets, published documents of the company itself, reports, etc.;
- d) Experimental – studies based on a group of people in a laboratory environment where they use a simulation or a relatively real scene of enterprise situations for analyzing and making conclusions on the results observed;
- e) Survey – studies that use as main method a questionnaire or interview for researches' data collection;
- f) Others – studies not classified in any of the previous types of study. It is possible to find related studies to case study, ethnographic and field study.

Next, the research results will be presented.

#### 4.4 Results

Figure 1 demonstrates the evolution of the research methods used in accounting research, specifically in Fraud risk & audit risk. Moreover, it can be noticed that Figure 1 answers the question: “Which is the main research method used in auditing?”, enabling to identify the presence of three types of research method: quantitative, qualitative and mixed method (qualitative-quantitative).

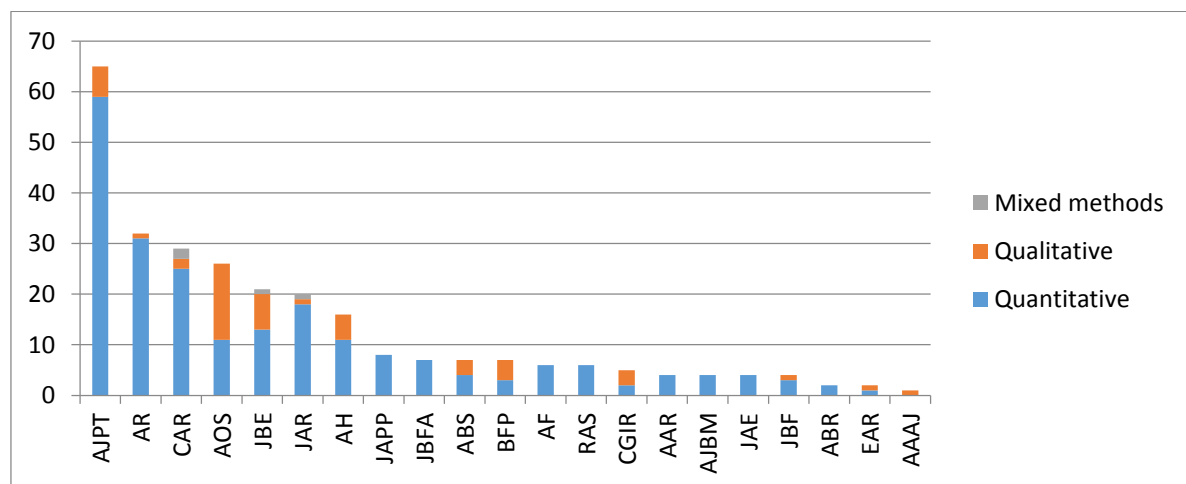


**Figure 1** – Research methods evolution (2002-2014)



The research method most frequently used in the study's sample was the quantitative one, being present in 222 articles. The qualitative method was used in 50 studies and the mixed method appeared in only four studies. Besides the quantification of the research methods present in Figure 1, we perceived a significant increase of quantitative methods in the researches, with a peak in the year of 2011.

Figure 2 presents the research method used by each journal, answering to the following question: "Which research methods are used in the main journals in auditing?"



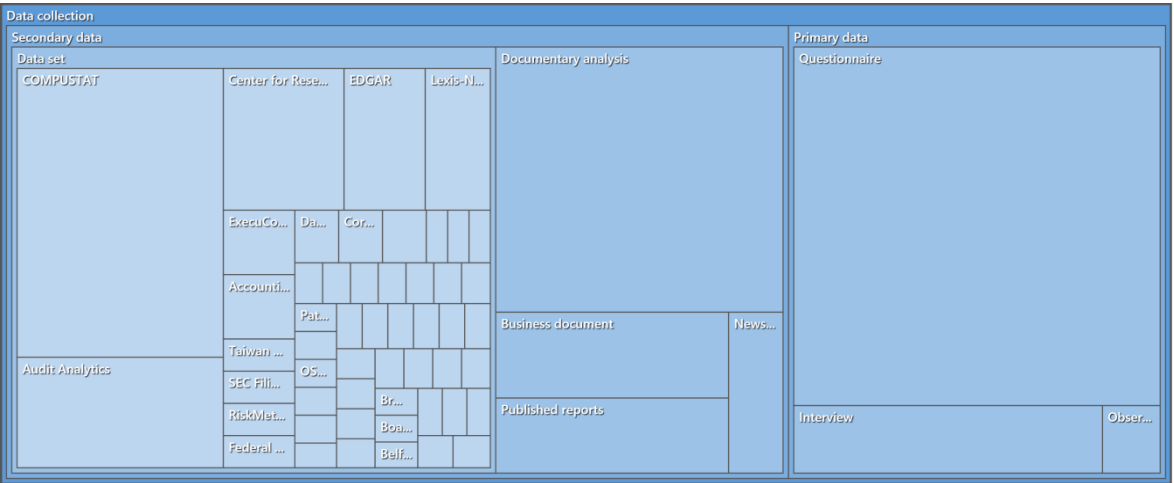
**Figure 2** – Research methods of journals in accounting

AAAJ - Accounting Auditing & Accountability Journal	BFP - Betriebswirtschaftliche Forschung Und Praxis
AAR - Australian Accounting Review	CAR - Contemporary Accounting Research
ABR - Accounting and Business Research	CGIR - Corporate Governance-an International Review
ABS - Abacus-a Journal of Acc. Fin. and Bus. Studies	EAR - European Accounting Review
AF - Accounting and Finance	JAE - Journal of Accounting & Economics
AH - Accounting Horizons	JAPP - Journal of Accounting and Public Policy
AJBM - African Journal of Business Management	JAR - Journal of Accounting Research
AJPT - Auditing-a Journal of Practice & Theory	JBE - Journal of Business Ethics
AOS - Accounting Organizations and Society	JBF - Journal of Banking & Finance
AR - Accounting Review	JBFA - Journal of Business Finance & Accounting
	RAS - Review of Accounting Studies

For this sample, the journals publishing about auditing and presenting the subject Fraud risk & audit risk in their research objectives/hypotheses are predominantly quantitative, confirming the data presented in Figure 1. Highlights to Auditing-a Journal of Practice & Theory (AJPT) for having presented the biggest amount of articles in the

sample. However, although most of the publications used the quantitative method, Figure 2 presents a prominence of journals Accounting Organizations and Society (AOS), Betriebswirtschaftliche Forschung Und Praxis (BFP) and Corporate Governance-an International Review (CGIR) in presenting more quantitative than qualitative studies about Fraud risk & audit risk in the study's sample.

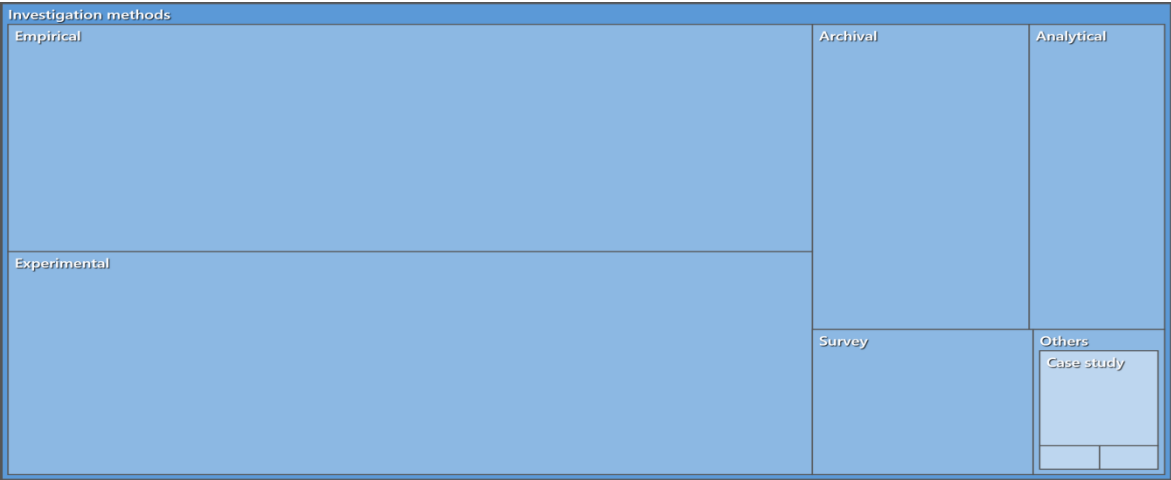
Figure 3 answers the question: "What are the main types of primary and secondary data collection used in the researches in auditing?". It is possible to identify in it a preference of use for secondary data relative to primary data. In primary data we identified the questionnaire as main method for data collection, followed by the use of interview and finally observation. As to the secondary data, the prominence refers to data set used by researchers, followed by the use of documentary analysis (articles, books, documents of agencies, documents not supplied by the researched company and by data set), company's documents (internal documents supplied by the company to the researcher), reports and journals. It should be stressed that we found 52 sources that supply data sets to researches in auditing. There is significant prominence to COMPUSTAT followed by Audit Analytics, Center for Research in Security Prices (CRSP), EDGAR and Lexis-Nexis.



**Figure 3 – Data collection in researched articles**

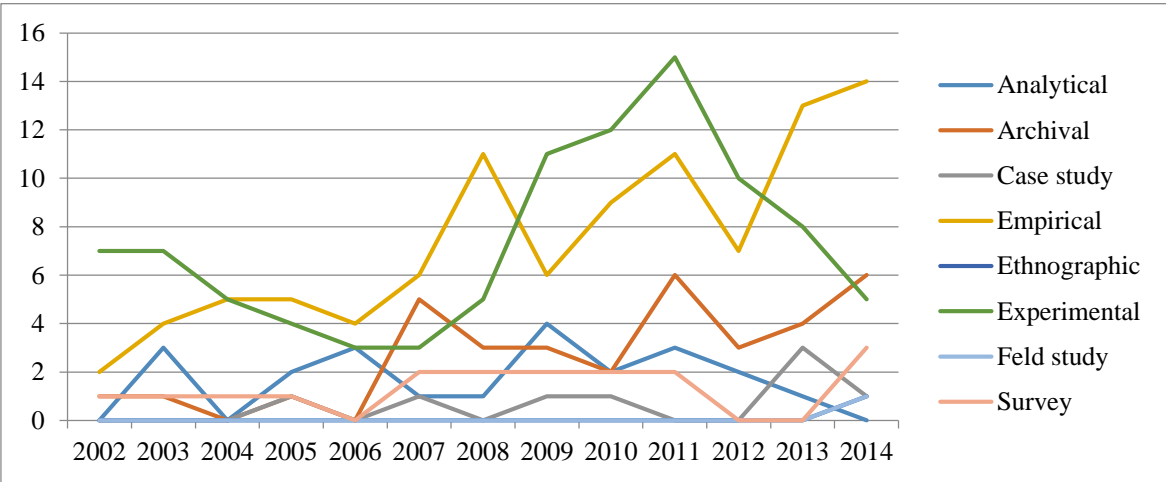
The information presented in Figure 4 answers the question: "Which are the predominant methods of investigation in auditing studies?". It can be observed that the method most frequently used in scientific investigations in auditing, found in the sample,

was the empirical one, closely followed by experimental, coming next are the methods of archival, analytical, survey and others (case study, ethnographic and field study).



**Figure 4** – Investigation methods of the researched articles

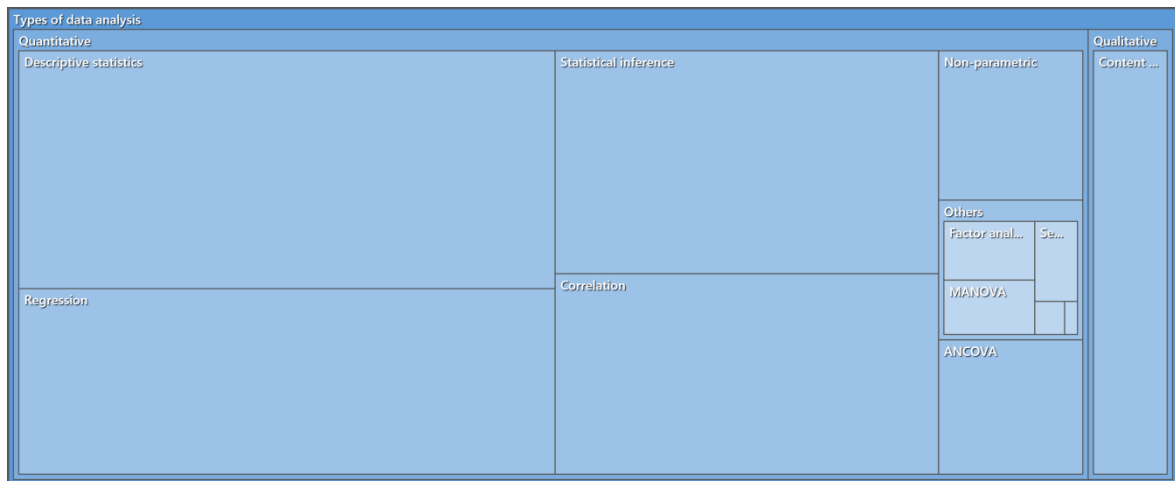
Figure 5 complements Figure 4, presenting the evolution of the investigation methods found in the study's sample during the period from 2002 to 2014. A significant evolution of the methods empirical and archival throughout time is evident. The method survey remained unchanged for a long time and then had an increase in 2014, the year in which this method presented its highest representativeness.



**Figure 5** – Investigation methods evolution (2002-2014)

The experimental study started in 2002 as the main investigation method observed in articles. Step by step its use had diminished until the year of 2007, and after this period it started to be considerably employed in researches until the year of 2011. Later, it had a critical decline ending the year of 2014 as the third most frequently used method.

Figure 6 answers the question: "Which are the main types of data analysis used in the scientific field in auditing?" In the qualitative analysis, by rule, the method of content analysis was the one utilized. However, in the quantitative analysis the methods used vary, with prominence to descriptive statistics, followed by the regression method, statistical inference, correlation, nonparametric statistics, ANCOVA and others (factorial analysis, MANOVA, analysis of sensitivity, MANCOVA and Loglinear).



**Figure 6** – Types of data analysis in the researched articles

In the next section, we present the articles found as result of the research categorized by the investigation method predominant in each study.

## 4.5 Investigation methods on Fraud risk & audit risk researches: the theoretical framework

Different methodological characteristics can be observed in accounting to identify various aspects related to fraud behavior concerning auditors and organizational managers. In this section, we present a literature review of the main investigation methods in auditing studies, specifically in Fraud risk & audit risk, based on this research's result.

### 4.5.1 Analytical study

There was a total of 22 studies analyzed using the analytical investigation method. In these articles it is possible to find mathematical models developed by the authors by the modelling of theories in order to assist them in their studies' analysis . In accordance with Davis and Pesch (2013) the majority of the companies, if not all, holds some kind of fraud

level. This assertion ratifies the necessity of researchers to commit to the study of Fraud risk & audit risk. Some of the studies found, examine emergent dynamic characteristics of fraud in organizations (Davis & Pesch, 2013), analyze the auditor's profession and tolerance to immaterial distortions (Mittendorf, 2010), furthermore, they evaluate fraud risk and formulate an audit plan to be used whenever there is a possibility of existing fraud in the audited company (Patterson & Noel, 2003).

In other cases there are studies related to the creation of models to assess the costumer's risk degree before the auditor accepts the commitment of a company's audit (Laux & Newman, 2010). Sample models of acceptance in view of reducing audit risk (Ohta, 2009) and develop standards may be used based on detected risk in customer's accounts using the classifications of credit balance to increase the probability of discovering manipulations in financial demonstrations (Baetge, Melcher, & Stoppel, 2011).

Scholars willing to use the method of analytical investigation in their research concerning fraud risk may use the Bayesian model, the theory of Dempster-Shafer or the Law of Benford. In the study of Srivastava, Mock, and Turner (2009), which illustrates the use of an evidential reasoning approach to reduce audit risk, and also in the studies of Beck and Wu (2006), in which they relate learning by doing with audit quality, the use of the Bayesian model may be observed. Srivastava, Mock, and Gao (2011) referred to the Dempster-Shafer theory of belief functions for managing uncertainties, while Cleary and Thibodeau (2005), explain the merits of each choice in terms of statistical concepts and practical audit process considerations using Benford's Law to detect fraud.

The researches on Fraud risk & audit risk are multiple, substantiating studies related to materiality (Budescu, Peecher, & Solomon, 2012; Patterson & Smith, 2003), risk of significant distortion (Toebe & Stahl, 2012), companies threats of firing auditors (Lu, 2006), imperfections of the audit committee (Schondube-Pirchegger & Schondube, 2011), accomplishment of several audits at the same time by one sole auditor (Beyer & Sridhar, 2006), determiners and consequences of auditor conservatism (Lu & Sapra, 2009), stimulating the communication of potential problems (Newman & Novoselov, 2009), analyzing relative exogenous inclinations to audit risk when an auditor obtains the information gradually (Ohta, 2008) and including the studies related to auditors' resources for internal control tests and substantive tests (Patterson & Smith, 2007).

All these studies have in common one only objective, which is to reduce the probability of Fraud risk & audit risk (Davutyan & Kavut, 2005; Patterson & Wright, 2003) using the analytical investigation method.

The procedure of data collection used in the articles was carried out by means of documentary analysis and quantitative research method. The methods of correlation analysis, regression analysis, descriptive statistics, nonparametric statistics and statistical inferences can also be observed.

#### 4.5.2 Archival study

A set of 35 studies used the method of archival investigation. In this group it is possible to find the predominance of qualitative studies and also one study of mixed method carried out by Gordon (2011). Therefore, the type of data analysis most frequently used is the content analysis. However, because of the existence of one article using the mixed method, it is possible to find in this study the use of descriptive statistics and statistical inferences.

In the studies on archival, documentary analysis is frequently used for data collection, found in the use of reports (Craig, Mortensen, & Iyer, 2013), journals (Cohen, Ding, Lesage, & Stolowy, 2010) and even data sets from Audit Analytics (Kinney, Martin, & Shepardson, 2013), Factiva and from the SEC Filing Library (Cohen *et al.*, 2010).

The results of the theme Fraud risk & audit risk with respect to the archival method present a quite varied literature. Amongst this we may refer to subjects such as accounting scandals (Ball, 2009; Kaplan, Roush, & Thorne, 2007; Scorgie, 2007), quality control of accounting firms (Bedard, Deis, Curtis, & Jenkins, 2008), development and application of Krisk (Bell, Bedard, Johnstone, & Smith, 2002), risk management (Brown, Steen, & Foreman, 2009; Power, 2009), audit strategies for whenever a client cannot determine directly the necessary effort to carry out an audit in a effective manner (Causholli & Knechel, 2012), aviation audit (Downer, 2011), measuring systemic risk (Ellis, Haldane, & Moshirian, 2014; Kronfeld & Krenzin, 2014), individual conscience in corporate businesses (Goodpaster, 2003), professional skepticism (Gronewold, 2011), factors affecting audit planning decisions (Hammersley, 2011), characteristics of firms

committing financial statement fraud (Hogan, Rezaee, Riley, & Velury, 2008), risk concepts (Holm & Laursen, 2007; Smieliauskas, Craig, & Amernic, 2010), analysis of the perspectives and principles reflected on the Green Paper published by the European Commission (Humphrey, Kausar, Loft, & Woods, 2011), disclosure of the engagement of a partner's identity in the audit report (King, Davis, & Mintchik, 2012), the business risk audit (Knechel, 2007; Mochty & Wiese, 2012), behavioral psychology in fraud detection (Kuhne & Grottke, 2014; Murphy & Dacin, 2011), a suspicious report of financial crime (Larsson, 2005), a vision of organizational fraud (Morales, Gendron, & Guenin-Paracini, 2014), threats to professional regulation (O'Regan & Killian, 2014), background and elements on strategic-systems auditing (Peecher, Schwartz, & Solomon, 2007), fraud risk and its difference from fraud (Power, 2013), argument factors affecting the truth of an audit opinion (Smieliauskas, Craig, & Amernic, 2008), fraudulent financial reports (Trompeter, Carpenter, Desai, Jones, & Riley, 2013) and the nature and extent of fraud acts from the perspective of non-accounting research (Trompeter, Carpenter, Jones, & Riley, 2014).

#### 4.5.3 Empirical study

In total, the research results include 97 articles classified as empirical study. Scholars willing to use this type of study in their investigations on Fraud risk & audit risk must consider, first, the use of a data set containing pertinent company information for data collection to the research in demand. It was possible to verify the use of the following data sets: COMPUSTAT, Audit Analytics, Center for Research in Security Prices (CRSP), EDGAR, Lexis-Nexis, ExecuComp, Accounting and Auditing Enforcement Releases (AAERs), among others.

Besides the companies data sets, which are frequently used in empirical researches on Fraud risk & audit risk, it is also possible to find other secondary data as companies reports (Hay & Jeter, 2011), journals (Hay *et al.*, 2007) and documents supplied by the company itself (Casterella, Jensen, & Knechel, 2009). Although unusual, one of the studies also used an interview as method for data collection (Elder & Allen, 2003).

The studies observed here are predominantly quantitative, except for the study carried out by Miller (2006) that was classified as mixed method. Thereby, additionally

there are examples of correlation analysis (Joe, Wright, & Wright, 2011), regression analysis (Lobo & Zhao, 2013), sensitivity analysis (Demir & Bostanci, 2010), factorial analysis (Schroeder & Hogan, 2013), ANCOVA (Huang *et al.*, 2014), descriptive statistics (Donohoe & Knechel, 2014), nonparametric statistics (Lee & Fargher, 2013) and statistical inferences (Markelevich & Rosner, 2013).

In the research result it is possible to find empirical studies which include Fraud risk & audit risk related to the contribution of audit colleagues information for the accomplishment of analytical procedures (Hoitash, Kogan, & Vasarhelyi, 2006), to aspects of the relation between indicators of Chief Executive Officer (CEO) narcissism and fraud (Rijssenbilt & Commandeur, 2013), to the impact of auditor industry specialization in companies going through indexation (Romanus, Maher, & Fleming, 2008), to auditing rules and their relation to audit efficiency (Vandervelde, Chen, & Leitch, 2008) and even referring to auditors' reputation and the impact on audit quality (Weber, Willenborg, & Zhang, 2008).

#### 4.5.4 Experimental study

The research results show 95 articles classified as experimental study. It is possible to verify a predominance in quantitative studies. Nevertheless, we could still identify two studies classified as mixed method (Mauldin & Wolfe, 2014) and one as qualitative (Gray, Turner, Coram, & Mock, 2011).

After submitting research participants through simulations or real scenarios related to companies situations, researchers clearly prefer using questionnaires to collect data (Desai & Gerard, 2013). However, it was possible to identify studies that used interview to collect data (Joe & Vandervelde, 2007).

In these studies, there is also presence of correlation analysis, regression analysis, factorial analysis, ANCOVA, descriptive statistics, nonparametric statistics, statistical inferences, Loglinear, MANCOVA and MANOVA.

The studies found in this research's result usually utilize in their experiences participants who are auditors (Wu, 2012) of Big 4 audit (Trotman & Wright, 2012), audit partners (Gold, Knechel, & Wallage, 2012), graduation students (Piercey, 2011), Master of



Business Administration (MBA) students (Lowe & Reckers, 2012), accountants (Liyanarachchi & Adler, 2011), internal auditors (Norman, Rose, & Suh, 2011) and managers (Seow, 2009).

Such experiences can be carried out online (Payne, Ramsay, & Bamber, 2010) as well as on paper (Libby & Brown, 2013). We must highlight that in many of the cases the participants receive some benefits to be part of the experiment, as in the study of Leung and Trotman (2005), where participants received ten lottery tickets, and in the study of Murphy (2012) where he paid one to four dollars to whom participated on the experiment.

There is a variety of subjects related to Fraud risk & audit risk, which use experimental studies. In this variety we list studies related to planning memoranda and if it affects the judgments of auditors (Agoglia, Kida, & Hanno, 2003), communication gaps between auditors and users of the financial statements (Asare & Wright, 2012), auditor's judgment and its impact in decision making (Ballou, Earley, & Rich, 2004), the effects of risk decision aid orientation in risk factors identification and in audit test planning (Bedard & Graham, 2002), auditors penalties and its impacts in efforts of fraud detection on audited companies (Burton, Wilks, & Zimbelman, 2011), brainstorming sessions of audit team (Carpenter, Reimers, & Fretwell, 2011), roles of the board and impacts in auditors risk assessment (Cohen, Krishnamoorthy, & Wright, 2007), factors on professional liquidators' decision to bring negligence claim against auditors (Ferguson & Majid, 2003) and, among other things, it is possible to verify risk factors of audit firms customers and the consequences in auditor planning decisions (Fukukawa, Mock, & Wright, 2011).

#### 4.5.5 Survey study

Between the articles examined in this research, 17 used the method of survey. In the presented studies it is possible to verify that scientific research on Fraud risk & audit risk uses auditors (Barrett, Cooper, & Jamal, 2005) and managers (Contessotto & Moroney, 2014) of audit firms (4 Big, national, regional and local) (Janvrin, Bierstaker, & Lowe, 2008), audit partners (Contessotto & Moroney, 2014), students (Emerson, Conroy, & Stanley, 2007) and professionals of accounting (Uddin & Gillett, 2002) to participate in their researches.

The main method of data collection used in the researches in survey corresponds to primary data in which it is possible to observe the use of questionnaires as main type used in the studies, followed by interviews and, finally, observation.

The questionnaires were distributed to participants in the following way: by mail (Coram, Ferguson, & Moroney, 2008), personal delivery (Hwang, Golemon, Chen, Wang, & Hung, 2009) and even electronic questionnaire (Brazel, Carpenter, & Jenkins, 2010) accessed by a link sent by e-mail to the research participants. In response to the researches' questions, along with the questionnaire, there was also the use of interview, structured (Robson, Humphrey, Khalifa, & Jones, 2007) and semi structured (Gendron & Spira, 2009; Van Buuren, Koch, Amerongen, & Wright, 2014) tested either face to face or by telephone (O'Dwyer, Owen, & Unerman, 2011). In the beginning of the questionnaire or the interview, the respondents are reminded of the research's objective, the anonymity of their participation and the academic purposes of the study (Maroun & Atkins, 2014). Observation was also used in the study of Barrett *et al.* (2005) throughout one year to verify work relation in multinational companies in global and local aspects by means of coordination mechanisms used by auditing firms.

The questionnaire, interview and observation, used in these studies, assist researchers in measuring research variables (Salehi & Khatiri, 2011). Can be cited: auditors ethical compliance model (Gul, Ng, & Tong, 2003), financial reports risks (Bedard & Johnstone, 2010), brainstorming sessions in the consideration of fraud (Brazel *et al.*, 2010) and a series of risk factors related to result manipulation and corporative governance (Bedard & Johnstone, 2004).

Additionally to primary data, we observed the use of documents supplied by companies as secondary data for data collection (Barrett *et al.*, 2005).

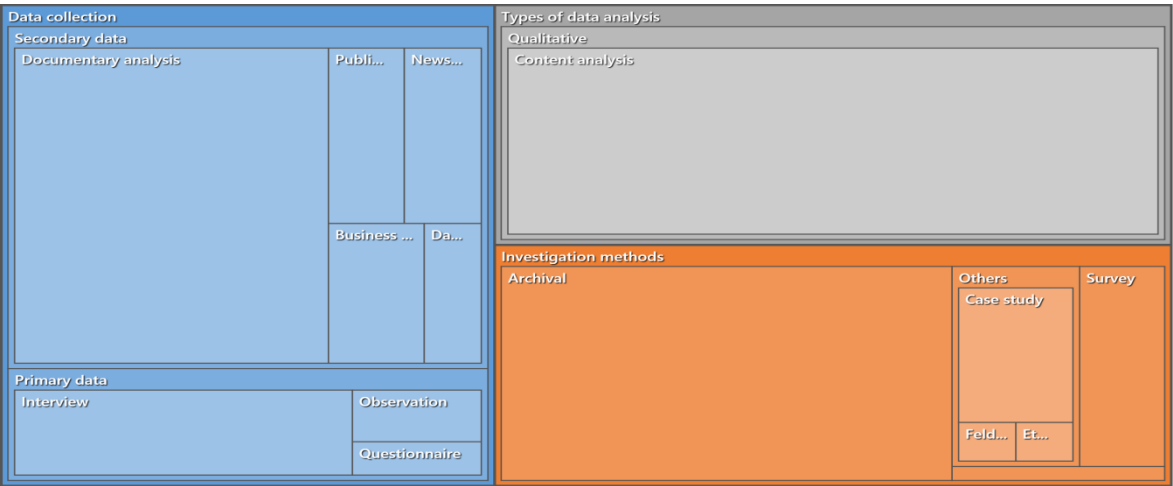
There is a predominance in the use of quantitative research methods in relation to the use of qualitative methods. This reflects on the fact that most of the questionnaires applied in the studies used quantitative methods for result analysis. In these studies, there is also presence of correlation analysis, regression analysis, factorial analysis, ANCOVA, descriptive statistics, nonparametric statistics and statistical inferences.

The next section presents the methodologies maps in auditing related to research method.

#### 4.6 Audit methodology maps by research method

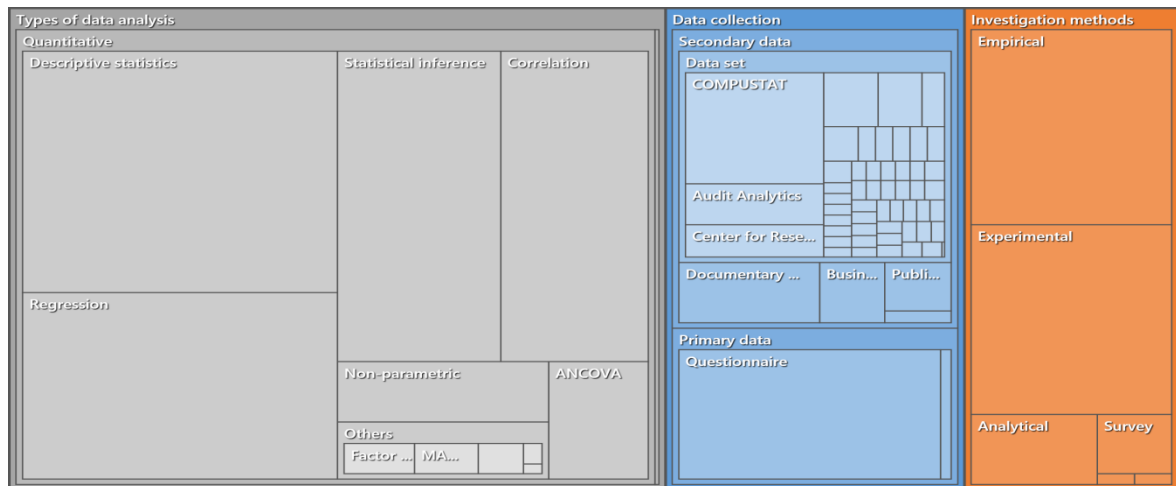
Based on the present research results it was possible to create three maps comprising the main methodologies applied to Fraud risk & audit risk study divided by research method (qualitative, quantitative or mixed method).

Figure 7 presents the map of the main methodologies found in qualitative studies on Fraud risk & audit risk. The map informs that the archival investigation method is predominant in qualitative research, drawing heavily on interviews as primary data and documentary analysis as secondary data. Content analysis is prominently utilized for analyzing data.



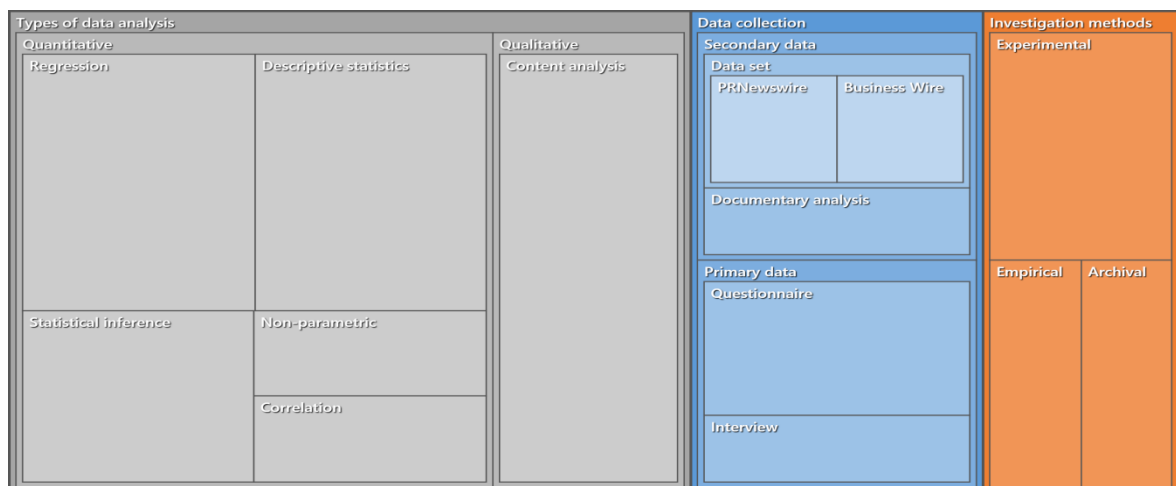
**Figure 7** – Methodology map related to qualitative research method

Figure 8 presents the map of the main methodologies found in qualitative studies concerning Fraud risk & audit risk. Scholars willing to publish in this field of study, based on the map, may observe a predominance in empirical and experimental studies as investigation methods. Moreover, basically, data collection is made by questionnaires and use of data set (mainly COMPUSTAT and Audit Analytics) and its analysis carried out mainly using descriptive statistics, regression analysis, statistics inference and correlation.



**Figure 8** – Methodology map related to quantitative research method

The map approaching the methodologies of mixed methods in Fraud risk & audit risk publications can be seen in Figure 9.



**Figure 9** – Methodology map related to mixed research method

As may be seen, the investigation methods found were: experimental, empirical and archival. To collect primary data the questionnaire and interview were used, as for secondary data were used data set (PRNewswire and Business Wire) and documentary analysis. The data are analyzed in the qualitative aspect by means of a content analysis, and in the quantitative aspect by means of regression analysis, descriptive statistics, statistics inference, nonparametric statistics and correlation.

With these maps, researchers may be able to better understand the state of art of qualitative and quantitative research in the area. The next section presents a discussion concerning all the results provided in this study.

#### 4.7 Discussion of the results

The studies about investigation methods in accounting, particularly in auditing, had their beginning in the research carried out by Smith e Krogstad (1984). These authors were pioneers by classifying accounting researches as experimental, modeling, normative/prescriptive, review and survey in 1984. Later, in 1988, the same authors extended their studies with a new nomenclature, defined as empirical and added to the group called review the nomenclature historical, changing this classification into review/historical. In 1991, the authors repeated the study carried out in 1988 adding, in its sample size, three years of publications of the same journal used primarily as sample. Besides the innovative facts of Smith and Krogstad's research, a focal point in their three studies is being limited to the existing publications only in the A Journal of Practice and Theory (AJPT), not presenting the reality of other publication sources.

Brown *et al.* (1987), three years after Smith and Krogstad's study, presented, in their study, the investigation methods of three journals (Accounting Review (AR), Journal of Accounting Research (JAR) and Organizations and Society (AOS)). Differently from Smith and Krogstad, the authors had classified the methods as: analytical-internal logic, opinion-survey, empirical-lab, archival-primary, archival-secondary, empirical-field, empirical-case and analytical-simulation. An abyssal distinction in this study is that it is not only limited to the use of publications in accounting. Consequently, its sample contemplates studies concerning psychology, multidisciplinary, management, sociology, political science, economics, finance, mathematics, engineering, statistics, amongst others.

Maijoor *et al.* (2000) used the results found in the studies of Smith e Krogstad (1991) as the basis for classifying the investigation methods to be used as a model. Although they had carried out a study of 949 articles from 23 periodicals, the results did not present any new classification to the investigation methods already described by Smith and Krogstad.

Later, Solomon and Trotman (2003) used the nomenclatures analytical, archival, JDM experiment, experimental economics, and questionnaire survey to classify 670 audit articles distributed in five journals in the period 1976-2000. Although they used only publications about auditing, the results did not present the investigation methods by audit

theme, but otherwise in a global manner for each journal analyzed separately considering the years of the published articles.

Chan *et al.* (2009) carried out a study of 247 dissertations classifying them as archival, experimental, modeling and survey. A major item used as sample of this study are dissertations. After all, the dissertations, although indexed to their respective institutions, did not receive the same harshness on evaluation as publications in journals. For such reason, although the authors did find the investigation methods in auditing and, therefore, in other areas (finance, management, systems, taxes) of the analyzed dissertations, their results may not reflect auditing as field of study, because only 28 dissertations were classified as auditing after all.

Coyne *et al.* (2010) and Stephens *et al.* (2011) produced studies concerning publications related to auditing as well as other areas as finance, fiscal, management and accounting information systems. In the results they presented the following investigation methods: analytical, archival and experimental. Still, this studies did not present the investigation methods by theme in auditing, but solely in a generic manner.

The present study unfortunately was not able to introduce any new investigation method (analytical, archival, empirical, experimental and survey). Even though, it contributed to the state of art in accounting, presenting for the first time information related to the collection of primary data (interview, observation and questionnaire) and secondary data (documental analysis, data sets, companies documents, journals and reports) in auditing, specifically in the theme Fraud risk & audit risk. Another important contribution is the presentation, in an innovative way in its results, of different types of data analysis. Particularly referring to quantitative studies, which presented a diversification of the methods used, with a distinction to descriptive statistics, followed by regression method, statistic inference, correlation, nonparametric statistic, ANCOVA and others (factorial analysis, MANOVA, sensibility analysis, MANCOVA and Loglinear). Finally, the greater contribution to the state of art of the current study, in the authors' opinion, may be the introduction of the methodologic maps presented by research method (qualitative, quantitative and mixed method).

These definitions expand the idea over research methodologies in accounting, going far beyond the classification of studies by research method and by investigation method, finding results regarding data collection and the types of data analysis used in the researches.

In the next section, we will present the conclusions, the limitations of this study and some perspectives that may assist researchers in future research.

#### **4.8 Conclusions, limitations and future research**

The objective of this article was to identify the main research methodologies in auditing, exclusively in publications on the subject *Fraud risk & audit risk*. We should highlight that this is one of the 16 themes found in the study of Lesage and Wechtler (2012) which characterizes the main thematic typologies in scientific research in auditing. This study's utility derives from the evidence that, although limited to a sample of 276 articles in auditing, exceptionally in *Fraud risk & audit risk* publications, comprehended in 21 academic journals, the studied theme has relevance to auditing and therefore to accounting.

What may companies and researchers learn from this study? Nine remarks can be cited in that respect.

First, by means of a content analysis of 276 articles published in 21 academic journals, this study presented an exclusive database of publications on the theme *Fraud risk & audit risk*, which may be used as a literature review by researchers of the area. Although the study's central objective was not to create this database, it was preponderant for analyzing the research's central objective which was to identify the main research methodologies in auditing, exclusively in *Fraud risk & audit risk* publications.

Second, the academic researches present efforts directed only towards identifying investigation methods in auditing. This is carried out in a limited and generic manner once the selection does not usually apply to a specific theme in auditing. Moreover, literature does not assist future researchers guiding them in the use of primary and secondary studies, and in the types of analyses that have already been used in auditing, neither presenting a methodology map related to each research method used in auditing studies.

In third place, it becomes evident for anyone willing to develop studies in accounting, specifically on *Fraud risk & audit risk*, that the predominant research method in most of the academic journals is the quantitative one. On the other hand, in time, the qualitative method have been gaining ground in journals and used more and more by researchers.

Fourth, researchers not using questionnaires (primary data) or data sets (secondary data) as *COMPUSTAT* and *Audit Analytics* should start adopting them, since these are the types of data collection most used in the sample.

Fifth, studies on *Fraud risk & audit risk* are concentrated in two investigation methods: *empirical* and *experimental*. Hence, researchers should use to their advantage the database created in the present study to better understand how the main investigation methods used are built and applied to accounting researches, and therefore benefited in their results quality.

Sixth, although qualitative studies have increased in this field study, researchers should acquire statistics knowledge to better analyze the existing studies, which are predominantly quantitative, and to assist them in future studies with the same aspects.

Seventh, this study was based on indexed journals in *Web of Science<sup>TM</sup>*. It is known that this database has more publications from North America than from Europe. The results of this study are coherent to this argument once most of the studies in the sample are linked to journals from North America. An assessment on indexed publications in *SCOPUS*, in which most of the journals related to this database are European, would provide more accurate information on the international research methodologies in auditing.

Eighth, this study is limited to the period from 2002 to 2014. A longitudinal study comprehending a longer period will enable scholars to analyze if and how the scientific research content in *Fraud risk & audit risk* has changed.

Finally, in ninth place, this study conceals the gray literature in accounting. Future researches should try to use this literature, once they tend to be undisclosed by most of the academies.



In a global aspect, this study is incapable to provide a map of the research methodologies used in all auditing themes already studied in scientific research. Even so, it presents a possible starting point to scholars in the decision making related to the type of methodology to be used in their auditing studies. Researchers willing to write about auditing will find the results of the present study useful in decision making when designing their research.

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## 5. THESIS FINAL CONSIDERATIONS

If we think about the academic practices and the tendencies of the methodologies in auditing in scientific research, we initially come across a universe of possibilities and at the same time a well not very profound. These facts take place by a simple motive. In spite of the historical existence of studies on research methodologies in auditing scientific research (e.g., Smith & Krogstad, 1984, 1988, 1991), these practices were not investigated throughout time. Although studies based on accounting methodologies are present in literature (e.g., Brown *et al.*, 1987), it is uncommon to find studies focused in only one sub-area of accounting. In other words, the studies are therefore generic, studying accounting but forgetting that within the accounting area reside auditing, cost accounting, managerial accounting, among others.

Aiming to carry out a research less generic and more relevant to a part of accounting, i.e. auditing, a fragmented study was carried out in three articles in which their results as a whole would be greater than the sum of their parts and thus it would add value to the research methodologies in auditing.

The first article refers to a bibliometric and scientiometric study of the auditing researches indexed in Web of Science database in the post-SOX period (2002-2013). The second article identified the auditing themes existing in Web of Science publications in the post-SOX period (2002-2014). Finally, the third and last article refers to the research methodologies applied to the theme Fraud risk & audit risk – a theme found in the accomplishment of the second article. Noticeably, the second and third articles had an addition of one year in relation to the period of the research sample of the first article. This occurred in the intention of broadening and updating the data.

The first article used the procedure of literature's systemic review grounding the bibliometric and scientiometric analysis of the publications in auditing from 2,394 publications indexed in Web of Science in the Social Science Citation Index (SSCI), specifically in the research area Business Economics.

The presented study was innovative in organizing a bibliometric and scientiometric research in auditing to characterize, strictly, studies published after the SOX

enacting. This analysis follows the literature's tendency giving importance to the facts impacted by the passage of the SOX. As an example, we cite Coates and Srinivasan's research (2014), which analyzes 120 academic studies aiming to map the positive and negative aspects of SOX's impact in auditing, as well as the limitations of the regulatory interventions made by this Law.

The results of the first study contribute to literature by presenting that most of the publications in auditing, in the post-SOX period, indexed in the Web of Science database, are gathered in only 13 journals, thus simplifying the researches quest in this area.

Another contribution of this research is related to confirming the prominence of the periodicals Auditing-a Journal of Practice & Theory (AJPT), Accounting Review (AR) and Contemporary Accounting Research (CAR) to literature development in auditing.

Lesage and Wechtler's findings (2012) report that AR is the first periodical of the American Accounting Association (AAA), and the oldest in English language in auditing, and, despite that, it has been losing strength in the scientific scenario in auditing because AAA have been creating new journals for publishing more specialized themes, as this study's results show. This conclusion is evident when analyzing the first study's results that present AR as the second journal with more publications in auditing, losing the position in literature for AJPT, and presenting only four publications more than CAR – this one growing its numbers in auditing publications through the years.

Still, the same authors state that AJPT is a relevant collaborator to auditing research, therefore being of consequence to literature's development in this field of study.

A result expected and confirmed is that authors bound to American universities carry out most of the publications in auditing, and it is in concordance with Narayanaswamy, Raghunandan, and Rama (2012) who state that the related researches in accounting/auditing are focused in an overwhelming manner in the United States. That said it should be taken into account that this datum needs comparison to other databases, as SCOPUS, concerning the fact that most of indexed journals in Web of Science are American, while SCOPUS presents the majority of European indexed journals.

Additionally, the current study shows in its results indicators as: Impact Factor, Eigenfactor, authors of prominence in auditing, number of citations of the main prominent works, journals with highest number of publications in the area and most used keywords. Such indicators must be used by researchers in the development of their scientific articles aiming a higher probability of approval in journals of reference in the field of study. This may be verified in the study of De Villiers and Dumay (2013) affirming that a journal's quality can be measured by the number of quotes in its articles and the quality of an article can be measured by the number of times it has been quoted.

One of the implications of this study was to provide knowledge over the quantity of publications in auditing of the main classification category in Web of Science and of the main publication sources. Thereby, this information was used to outline the best strategy for the composition and development of the second article. The results enabled us to answer the first specific sub-question of the thesis research presenting the main bibliometric and scientometric characteristics of the publications in auditing indexed in Web of Science.

The second article sustained the essence of its predecessor utilizing a systemic revision of the literature for the procedures linked to the study's methodologies, and caught a brief glimpse of bibliometry to support the selection of its sample and some of its results.

This article emerged in virtue of the necessity of knowing the existing themes in auditing in order to accomplish the next step, which was the achievement of the thesis third study.

Based in Lesage and Wechtler's statement (2012) that little is known about the dissemination and evolution of research themes in auditing, the second article aimed to analyze the evolutionary process of the themes in auditing and their associations in the post-SOX period, using a content analysis of objectives and hypotheses of the 1,650 publications indexed in Web of Science (2002-2014), in the Social Science Citation Index (SSCI), specifically in the research area Business Economics. The second article's sample was extended to 2014, one year more in relation to the period studied in the first one.

There may be questioning over the necessity and the utility of knowing the existing themes in the area, specifically in auditing, after all, despite the existence of three decades of studies, there is little research on this perspective (e.g. Maijoor *et al.*, 2000; Lesage & Wechtler, 2012). What cannot be forgotten is that, once there is a new striking fact in a field of study, i.e. the Sarbanes-Oxley Act to auditing, researches should be updated based on analysis in order to attain the effects of this new fact.

In this manner, this study accomplished to present in its results three groups of themes represented as established, declining and emerging, after the passage of the Sarbanes-Oxley Act.

An important aspect to be analyzed in this type of classification is that the themes presented as established (Audit Market, Audit report & financial statement users, Corporate governance, Fraud risk & audit risk, International regulation, Liability & litigation and Non-audit services) are strengthened in literature despite the changes after the SOX enacting. By means of a content analysis, supported by bibliometry, we could identify that this group of themes were not left aside by researches. On the contrary, they were found in every year of the sample and there was an evolution in their representativeness percentages when compared to previous studies (e.g. Lesage & Wechtler, 2012).

An example of this evolution is the theme Non-audit services. As the SOX prohibited auditors to provide several non-audit services to their clients on audit (Desir, Casterella, & Kokina, 2014) and, based on that imposition, researchers used this factor to measure if, actually, firms are complying with the SOX commands, once this factor affects auditors' independence. The establishment of the theme Non-audit services contradicts Coates and Srinivasan (2014, p. 652) statement that "indeed, by banning such services, SOX has made further study difficult due to the elimination of observed variation in practice".

We may also quote the increase of the researches on Audit Market, in consonance with the prospect of Desir *et al.* (2014), affirming that the lowballing practice would be resumed in the post-SOX period. That is, to know if auditors are charging lower audit fees in the first year to new clients and expecting to increase those fees in later years, enhanced

the studies in Audit Market after SOX enactment, lining up with this researches results, thus establishing the theme in Audit Market.

The study of Coates and Srinivasan (2014) including 120 articles presents in its conclusion that the SOX enactment added benefits to financial report quality. This factor is in consonance with the increase of the studies in Audit report & financial statement users, between 2002 and 2014, creating its establishment, by measuring if SOX actually brought any contribution to the financial report.

These facts illustrate how researchers are establishing this group of themes, throughout history, as a pillar to the development and evolution of literature in auditing. In addition to this reasoning, Franzel (2014) states that the continuity of the studies is necessary to assess how failures occur in auditing and corporative governance systems, and how should we prevent it. The same author adds that the research in auditing helps in maintaining the trustworthiness in financial statements and in audit by assessing the progress and determining the actual and future risks to the area.

Another interesting fact observed is the decline of a group of themes (Audit procedures, Audit sampling, Auditor's judgment, Auditor-auditee contract, Education, Going-concern opinion, Profession and Tax audit) witnessed in the last years. This decline is characterized by the diminishing of the representativeness percentages in comparison to the existing literature (e.g. Lesage & Wechtler, 2012).

As an example, we may quote the theme Going-concern opinion Carson *et al.* (2013) state that there is little research related to GCOP for Non-Profit and Governmental Entities. Another factor is that, besides the increase in auditor's responsibility in issuing the clients going concern status, this action was relatively rare (Amin *et al.*, 2014).

Perceiving that the auditors would avoid emitting their clients going concern status, the Financial Accounting Standards Board (FASB) decided to require, in 2012, that the audited companies perform going concern and that this information was to be opened in footnote (PricewaterhouseCoopers, 2012).

This statements are in consonance with the results found that indicate a decline in the theme GCOP through the years, despite the results indicating that 2013 was the period

that GCOP presented more published articles in the study's sample. An important aspect to the future is to examine if the changes enforced by FASB will stimulate researchers to publish once more about GCOP, leaving its condition as a declining theme, to become an established theme.

It is crucial to debate in conferences the reason why researchers seem to have no interest in themes here classified as declining. For all practical purposes, besides the evolution that has caused new theories to emerge and substitute the old existing ones, it is necessary to pay attention to this fact. After all, it is not interesting to any area to discover that the themes used as pillars of its development, are going through a scientific extinction process. Researchers cannot limit themselves to only writing themes considered interesting for publishing in auditing. Researchers and professionals of this area should evaluate those changes and try to give new perspectives to the themes of the past so they would not be forgotten in scientific limb.

An unexpected event evidenced in the results was identifying a group of emerging themes (Audit committee, External audit, Internal audit, Internal control, Media coverage in accounting, Research and Socio-economic data of the company). This group of themes reveals possibilities so that researchers interested in emerging themes may prospect for unexplored areas, working on subjects not yet studied in that theme, as well as being responsible for the innovative development of these themes. Although unexpected, this group had already been described by Lesage and Wechtler (2012) when they affirmed that, in order to contribute to a better understanding of auditing research, future researches should be carried out by research theme to identify which emerged and evolved throughout time.

As example, we could cite the theme Internal control which increased in strength in 2007 and was considered as emergent because of the good results found in retrospect throughout the years of the sample. This fact meets Graham and Bedard's idea (2013, p. 46) arguing that a "research on the costs and benefits of Section 404 remains important, due to continued political pressure to reduce financial regulation".

Lastly, it is known that it is common to researchers, when writing a scientific article, to use more than one theme in their literature review. Hence, this study presents as



one more result the identification of thematic associations existing in auditing, a fact not observed in accounting literature until now.

Having the information on which themes are established, declining and emerging, researchers may easily decide how to carry out their researches by being able to choose which themes should be included in their literature review and, thence, which may be affected by their research questions and studies hypotheses considering their thematic associations.

We emphasize that the present study was innovative in carrying out a content analysis on auditing themes of the research objectives and hypotheses, also being the first to use a longitudinal sample from 2002 to 2014, comprehending solely the effects of the SOX enactment in scientific publications in auditing.

Although this was not the study's main objective, it was innovative by presenting for the first time in literature proof of the existence of thematic associations and their behavior in auditing. This last factor is of consequence to literature indicating that scientific advance usually occurs in associating the study's central theme to other themes in the area. Besides, the present paper contributed to the academic world by extending and updating the 16 themes known in auditing literature to a total of 22.

Its results permitted to answer the second specific sub-question on the thesis research by presenting the evolutionary process of the existing auditing themes in the post-SOX era. It must be emphasized that the results found are not definite. Therefore, new researches must be carried out to confirm if the factors found will maintain their effects in the future.

We should reinforce that it was only after the conclusion of the second article that we could outline the best strategy to plan and develop the third one. According to the second article's results, we found 22 themes in auditing and decided to use a single theme to characterize the main research methodologies in auditing. The selected theme was Fraud risk & audit risk, because it is one of the seven themes classified by the results as established, given its presence in the every company's routine, regardless of size, classification or organizational structure. This idea sustains Franzel's perspective (2014, p.

918) in which he affirms that the studies related to auditing risks “will continue to be of fundamental importance to help advance auditing practice and regulation to protect investors and the public interest”.

The third article remained in the same line of its predecessor utilizing a systemic review of the literature for the procedures associated to the study’s methodology, and caught a brief glimpse in bibliometry to support the selection of its sample.

Finally, the third and last article presents the main result of this thesis. It was developed in order to conclude the research’s cycle. This study is valid because the research related to research methodology in auditing is in its third decade, and relative to accounting studies the information in literature referring to the type of choice and data analysis in auditing academic production is undisclosed. That is, we know which are the main investigation methods used in auditing research, still, we do not know detailed information about its methodologies.

To improve this gap, the third article includes a study on research methodologies in auditing, specifically in Fraud risk & audit risk, characterizing the research and investigation methods, as well as the data collection and analysis in the researches. Therefore, 276 publications in Fraud risk & audit risk were analyzed, including 21 journals, during the period from 2002 to 2014 by means of a content analysis of the applied methodology.

The results presented three maps of the main methodologies classified by their research methods (qualitative, quantitative and mixed method) applied to Fraud risk & audit risk studies, a fact not investigated in the accounting academic literature until now. In each map, it is possible to observe the investigation methods, primary and secondary data collection and the types of data analysis, distributed by research method.

It is possible to observe in the results that the studies related to Fraud risk & audit risk are mostly quantitative. An effect of this was that the data collection of the majority of the studies was carried out using secondary data, with prominence to the use of data sets, in particular COMPUSTAT, and afterwards, the documental analysis as preference for the most used methods. As for primary data, we observed the large application of the

questionnaire. In addition to the data found, Carson *et al.* (2013) affirm that several studies utilize data enclosed in data sets, especially COMPUSTAT, for their analysis.

Relative to the predominant investigation method, there is almost an equality between empirical and experimental methods. The empirical method have been increasing during the last years, while the experimental is declining. This study's results point out a tendency for the empirical method to prevail, as suggested by Alam and Petruska (2012), who stated that empirical studies must be carried out to investigate if the accounting conservatism is in fact different in fraud and non-firms, even after SOX compliance requirements.

We must emphasize that, regardless of the prevalence of empirical as investigation method, there are areas in Fraud risk & audit risk not much investigated, demonstrating how much this method's investigation could increase. Additionally to this studies results, Amir, Kallunki, and Nilsson (2014, p. 104) affirm that there is an absence of empirical studies "about how individual audit partners' personal risk preferences affect client portfolio decisions".

Thereby, the present study was innovative carrying out a research on auditing research methodologies, specifically in Fraud risk & audit risk, not limited only by literature already known (investigation methods), presenting for the first time other methodological parameters (research methods, data collection and type of data analysis) to characterize, extensively, the research methodologies in scientific studies in auditing.

Literature presents in a generic aspect the investigation methods in auditing. Nonetheless, it is not evident, actually, how studies are carried out in each thematic area in auditing. Eventually, some themes may use more empirical investigation methods and others experimental ones. It is of importance that researchers should know the actual behavior of the research methodologies in their thematic area in auditing and, thus, be able to perceive the tendencies of methodological advance towards the future.

Still, we observe that the studies, at least in Fraud risk & audit risk, are mostly carried out using databases, particularly COMPUSTAT, to collect data. This is an important tendency for researchers willing to utilize financial, statistical and market

information on global corporations active or not active, must utilize COMPUSTAT or other similar database.

As presented in the second article, 22 themes in auditing were found, and the results displayed in the third article comprehend only one of the themes. In addition, we consider relevant the information on the behavior of the other themes in auditing to define the future methodological directions of the researches in auditing.

The results observed in the third article enabled us to answer the third specific sub-question on the thesis research by presenting the maps of the main research methodologies in auditing, specifically in publications on Fraud risk & audit risk, existing in the post-SOX period.

When analyzing the three articles as a group, it is possible to identify how auditing publications are structured, beginning by their bibliometric and scientiometric aspects, then observing the thematic characteristics and, finally the research methodologies.

This thesis is innovative by examining the effects of SOX in auditing, at first by an approach of its representativeness, followed by studying in detail the themes in the area comprehending its thematic evolution and, finally, characterizing the research methodologies in respect to a single theme in auditing. We should emphasize that the studies are not independent, that is, the third study could only be accomplished after the findings presented in the second study, and, ergo, the second study was necessarily bound to the results of the first one.

The results of these studies were able to present a more representative image of the scientific production in auditing nowadays in comparison to literatures knowledge, which was out of date. As could be noticed, the results demonstrate that the SOX enactment was responsible for the stimulus of the scientific and theoretical development in auditing throughout the years, besides the controversial nature of the Act since its passage (Coates & Srinivasan, 2014). At last, the present thesis brings up to date what is known about auditing in literature and presents associations not yet seen in the area. Nevertheless, future researches about the process of immersion and evolution of the scientific themes and

research methodologies in auditing must contribute to a better understanding of the research in the field of study.

We may notice that, outlining studies similar to the present thesis are extremely important to the advance of auditing research, as well as to other areas of accounting. This is due to the easy access that we have nowadays to several international journals indexed in databases, which, previously, was unthinkable, being practically impossible to carry out similar studies. Consequently, we should not only know the literature existing in our countries, as well as the international literature in our field of study.

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